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AN ASSESSMENT OF
ENVIRONMENTAL IMPACT RESULTING
FROM THE PROPOSED
EXPANSION OF WAIMEA FALLS PARK

Prepared by:

BISHOP CORPORATION

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INTRODUCTION

Study Purpose

The purpose of this environmental impact statement is to provide all concerned parties with:

- (1) A description of the present Waimea Falls Park facilities, recreational potential and goals, and aspects of the Waimea environment.
- (2) A description of the proposed projects for Waimea Falls Park and an analysis of the resulting environmental impact in the near and distant future.
- (3) Alternatives to the proposed projects and an analysis of their environmental impact.
- (4) A document which has been prepared in accordance with the Governor's Executive Order of August 23, 1971 and the State Office of Environmental Quality Control Manual for the Preparation and Processing of Environmental Impact Statements (Final Draft, October 4, 1972).

Scope of Study

The project site at Waimea has been limited to the area depicted in Exhibit 1 and known as Waimea Falls Park.

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CHAPTER I

GENERAL DESCRIPTION

Waimea Valley is located on the north shore of the island of Oahu, approximately 35 miles from Honolulu, and 2.8 miles northeast of Haleiwa. Waimea is most commonly known as the site of Waimea Falls, which residents and visitors alike have enjoyed for many years. It was here that foreigners first touched the island of Oahu, to replenish their ships water supplies from the Waimea River. In those days, the Hawaiians utilized the valley for primarily agricultural purposes; there was a great abundance of cultivation, including taro, oranges, sugar cane, bananas, breadfruit, coffee and awa. Many aspects of its agricultural past are still evident and available for visitors to see as are some of the burial caves, animal enclosures, and agricultural sites.

The property is identified by Tax Map Keys 6-1-02-2,3,15,16,17,19, 20,21, and is owned in fee by Bishop Corporation, who purchased the property from Castle and Cooke, Inc. in 1969. The property is designated for conservation use; comes under the jurisdiction of the Department of Land and Natural Resources; and consists of approximately 1,800 acres. The entire property is known as Waimea Falls Park. The property boundaries are shown in Exhibit 1.

The present park structure consists of a recently opened food facility, country store, restroom, an administration center, and large lanai area all of which approximate 7,000 square feet of ground floor. Also newly constructed is the Waimea Falls Park depot that acts as a shelter for visitors awaiting transportation, should they decide not to walk, through a portion of the valley and to the falls. All utilities have been placed underground, the entry road to the Park facilities has been

improved, and extensive landscaping has taken place and is currently in progress to enhance the natural beauty of Waimea Valley. Responsible for the landscaping program is Waimea Arboretum, a vital part of the development concept of Waimea Falls Park. In addition to landscaping and planting of the grounds, Waimea Arboretum has established extensive nursery stock and is in the process of creating botanical garden areas throughout the park that concentrate on various families and species of plants. Through seed exchange programs the staff has gained access to many rare and endangered species of plants from all parts of the world, which can be grown and propagated in Waimea for display and study.

Support facilities consist of the necessary Arboretum structures, such as a small office, temporary screened seedling area and equipment storage shed. A maintenance shed of approximately 3000 square feet used for vehicle and equipment maintenance, repair and storage is located out of sight from the visitor facility.

The food facility, country store, restroom facilities and large surrounding meadow are available to the public for no charge. Admission to the park is \$2.00 per adult, \$1.00 for children 7-12 years of age, and free for children under seven. Annual passes are also available.

In their present state Waimea Falls Park and Waimea Arboretum have just begun to tap the potential of the valley as a historical, recreational and botanical park that is not only unique in Hawaii, but readily available to the people of Hawaii and its visitors. The proposed master plan of the Park and Arboretum is to utilize this potential more fully in order that more people may enjoy the natural beauty, the recreational, cultural and educational aspects of Waimea Falls Park.

A general description of each of the proposed projects follows. A detail project description of each proposal, and its environmental impact,

and alternatives will occur in a later section of the report.

It has become apparent that additional parking is a necessity to adequately handle an increase in visitors. The present parking facility can handle approximately 85 cars and six buses. While not currently overcrowded on a normal week day, weekends find many more cars at the park than the parking lot is capable of handling satisfactorily. As the Park attractions are expanded, and promotional advertising utilized, a parking shortage will become a very serious problem.

The additional parking plan calls for creation of contoured and heavily landscaped parking areas which are not visible upon entering or leaving the park. The proposed layout will also allow for a one-way traffic pattern, which will make for a more effective traffic flow, create a safer park, and help relieve traffic congestion at the park entrance. Realignment of the entry road in this area also allows visitors a scenic view of Waimea Stream as they approach the park entrance. A landscaped trail and picnic areas along the stream will be available for visitor enjoyment.

In an effort to better serve visitors and to provide a choice of dining facilities, a full service restaurant on the second floor of the new facility is planned. This area was previously designated as an apartment for management but the utilization of an old home in the immediate vicinity has proven more satisfactory for this purpose. Use of the second floor area as a restaurant will expand visitor enjoyment and will serve to compliment the snack bar facility on the first floor. The restaurant will provide an atmosphere more relaxing than the snack bar, and will also make available to residents of the North Shore another pleasant place to dine at reasonable prices.

Since Bishop Corporation's acquisition of Waimea Valley, the work in botanical gardens and the arboretum has greatly expanded. The intent is to create an arboretum of decorative, educational and scientific value encompassing the entire valley. The site for the Waimea Arboretum is of great value horticulturally because of its size and the diversity of the "ecological niches" present. As a result, it will be possible to establish an extremely wide range of plants from tropical and sub-tropical areas of the world at this location. There will be more than just a collection of plants. At a time when plant species are disappearing in the wild at an alarming rate, such a botanical collection forms a living "gene pool" and such material may have immense value in the future, i.e., breeding purposes, disease control, and aesthetic value. In addition, a collection of plants of this kind enables a host of activities loosely combined under the heading of "research" to be conducted. Examples of these activities might range from publishing in scientific journals the success and failures of propagation techniques to supplying herbarium specimens of plants to taxonomists; from details of how an aesthetically pleasing grouping of plants was made, to building up a complete collection of a certain family or genus, so that a diversification of living plants growing side by side can be studied by scientists. There are other important functions that such a plant collection can serve in the field of education. People with an interest in plants can be brought in as trainees; school children can be shown the conduct of work in gardens and be taught an appreciation of horticulture; workshops for people of all ages can be held; and, most of all, visitors will be able to experience the essence of Hawaii in Waimea Valley. The short and long range possibilities are endless.

An example of Arboretum projects now underway is the re-introduction of Hibiscus Youngianus, and after an absence of many years, research into re-establishment of the Sandalwood, and propagation of many native Hawaiian plants facing extinction.

In order to achieve these goals it is necessary to expand and build the supporting facilities commonly utilized in this type of operation. All structures will be located within the nursery area, and will not be visible from other areas of the park.

The recreational potential of Waimea Falls Park can only be realized if the entire valley area is made readily available to visitors. This can be accomplished by vastly increasing the areas available for picnicking, the number of hiking trails, and the number of bridle trails. Due to the size of Waimea Valley, the opportunity of providing a wide range of camping sites, ranging from vacation cabins to designated camping areas is immense. The master plan calls for the designation of 12 cabin areas, each area to contain no more than 10 cabins depending on the topography. These cabins would be similar to those found in our State Parks, and be situated such that each has its own open areas.

The Bishop Museum recently completed an archaeological and historical survey of Waimea Valley, uncovering an abundance of the valley's agricultural past. A portion of uncovered wall remnants is visible to visitors as they ride through the south valley on the way up to the falls. A great amount of Hawaii's past is located in the north valley, down which the Elehaha Stream flows during wet periods of the year. This valley is presently not accessible. The natural beauty in this

valley mingled with the remnants of a past civilization creates a visitor experience different but equal to that available in the south valley where the falls are located. The master plan endeavors to make this area available to visitors with a transportation system possibly similar to that which now services the falls and south valley, or a system utilizing tracks. A turn-around would be located approximately two miles up the valley, thereby providing a four mile ride through some of the most beautiful area our island has to offer. This system would also create a means of access to picnic areas, campsites, and cabins located in the back sections of the park.

CHAPTER II

CHARACTERISTICS OF WAIMEA VALLEY

Topography & Geology

Waimea Valley proper extends 2 3/4 miles mauka from the shoreline up into the foothills of the Koolau Range. For this distance the valley is well defined by the presence of plateaus on both North and South boundary ridges. Beyond this distance the valley begins to lose its identity in the many valleys and ridges emanating from the northern end of the Koolau Range. Waimea Falls Park property extends 3 1/2 miles from the shoreline to the mauka boundary, and up to an elevation of approximately 1,000 feet at its highest point. Four-fifths of a mile mauka of the shoreline the valley is bisected by a ridgeline that extends up through and beyond the boundaries of the Park, forming a north and south valley. The valley walls average from 200 feet to 300 feet in height above the accompanying stream beds. In some areas the valley walls are very steep and rocky. Other areas find cliffs of a gradual slope, where very dense growth is found. The lower sections of the valley have a predominance of very steep and rocky cliffs; the more gradual cliffs are found in the higher elevations.

Three major streams are found in Waimea Valley - Elehaha which periodically flows down the northern valley; Kamananui, the dominant stream, flowing through the southern valley, on which is located Waihee Falls; and Kaiwihoele Stream, which joins into Kamananui Stream about 1,000 feet below Waimea Falls. Many small water courses from the numerous gulches throughout Waimea feed the streams. This drainage

system all eventually leads into Waimea River and flows out to the ocean.

Geologically Waimea is part of the Koolau Volcanic series of Oahu. This series of volcanoes extends from Kahuku to Koko Head and is the largest of the two systems of which the island of Oahu is comprised, the smaller being the Waianae series. Hawaii's mountains are all volcanic in nature, as opposed to created by the process of orogeny, as are many of the major mountain ranges of the continents.

Waimea is part of the lava flood plain area associated with the Koolau series. It is characteristic of the older sections of the two Oahu volcanic series, as indicated by the degree of stream and water erosion found and the soil types present. What was at one time a gently sloping plain, not unlike that found in many sections of the lower slopes of Mauna Loa on the island of Hawaii, there now exists deeply cut valleys and steep cliffs. The high degree of meandering of the Kamananui Stream through the upper and midsections of Waimea indicates considerable aging of the geological processes.

The ridge lines tend to be narrow and precipitous; some sections of the valley floors are comprised of gently sloping alluvial plains with secondary stream cutting. A predominance of this formation is found up the south valley on the route to the Falls.

Soil Classifications

There are three distinct areas of soil classifications found within Waimea Falls Park.¹ These divisions would be mountainous, mid-valley, and

¹ U. S. Department of Agriculture Soil Conservation Service Survey, 1972.

lower valley or makai.

Seventy-five percent of the mountainous area is comprised of Helemano silty clay with 30% to 90% slope. This soil is commonly found on the sides of V-shaped gulches. It contains some areas of rock outcrop, steep stoney land and eroded spots, which is normally a dark reddish brown clay with moderate permeability. Runoff is medium to very rapid, the erosion hazard is severe to very severe. This type of soil usually is found in woodland and wildlife habitat areas.

Fifteen percent of the mountainous area is classified as rough mountainous land. This is defined as very steep land broken by intermittent drainage channels, and tends to be not stoney in most areas, with a thin soil mantle. The remaining 10% of the mountainous area is comprised of Kapaa silty clay, normally found in 40% to 100% slopes. It is characteristic of very rapid runoff and severe erosion hazard. Much of the surface layer is removed by erosion.

The mid-valley areas or central third of Waimea Falls Park is dominated by rock land, which makes up approximately 70% of the soil. Rock outcrops and very shallow soils are the main characteristics. The rock outcrops are mainly basalt and andesite. Soil material is usually very sticky and plastic. In areas of substantial rainfall heavy vegetation may be found. Twenty percent of the mid-valley is comprised of Helemano silty clays, similar to that found in the mountainous area. The remaining ten percent of the mid-valley area is Kawaihapai stoney clay loam. This soil contains enough stoniness to hinder cultivation, has slow runoff and slight erosion hazard. It is found along stream beds which generally slope 6% to 15%.

The lower valley is comprised of more soil types than found in the

mountainous mid-valley sections, and are listed as follows:

1. Rock land as described above makes up 55% of the lower valley, primarily being the steep cliff areas.

2. Kawaihapai stoney clay loam, as found in the mid-valley makes up 20% of the lower valley; and is found along the stream alluvial deposit areas.

3. Fifteen percent of the lower valley is Kawaihapai very stoney clay loam, which is similar to Kawaihapai stoney clay loam but contains too much stoniness for cultivation.

4. The remaining ten percent is made up of two soil types representing about 5% each. Hanalei silty clay is found in stream beds and flood plains. This is very deep, well drained alluvium soils, with moderate permeability, very slow runoff, and slight erosion hazard. Flooding can be a hazard with this soil type. The remaining 5% is Juacas sand, which is well drained calcareous soil developed from wind and water deposited sand derived from coral and sea shells. Permeability is rapid and runoff is slow. The water erosion hazard is slight but wind erosion is severe where vegetation is removed.

Climate

Due to its location and topography Waimea Valley has two distinct climatic conditions. The mauka section of the valley, or approximately the upper 2/3 of Bishop Corporation's property, receives an annual average rainfall of about 70 inches. The makai third of the valley receives an average annual rainfall of close to 30 inches.

The north-east trade winds blow in from the ocean and bring with them moisture laden clouds which "pile up" against the Koolau Range.

These clouds are met by the cooler air rising from the higher elevation mountainous areas. This results in considerably higher amounts of precipitation than found along the Windward coastline where a majority of the rainfall is from ocean originated "rain squalls" which cause periodic rainfall as they do at sea. The higher elevation rain clouds, as they discharge their precipitation, drift over the Koolau mountains and down into the Leeward valleys, losing their moisture continually. The upper reaches of Waimea Valley receive a considerable amount of this residual high elevation rainfall. Waimea Valley is located at the northern end of the Koolau range with the length of the Valley lying parallel to the Koolau Range. This results in the high elevation rainfall passing over the upper sections as opposed to sweeping down the length of the valley. Drier tradewinds having blown over the low lying northern end of Oahu continue down the north shore and across the lower hills adjacent to the shoreline areas. These two systems result in the two distinct climatic conditions found at Waimea - higher elevation rainfall in the upper sections; and coastal drier conditions in the lower sections.

The shape of Waimea Valley and its ridges have a tendency to "bend" the prevailing north-easterly tradewinds, which come over the Koolau Range, to blow from more of a east-south-easterly direction that roughly corresponds to the direction down the valley. Due to the high, steep sides of the valley many wind "eddies" occur which result in wind from all points within a short time period. This tends to upset any steady wind pattern, but in spite of this the dominant direction, as mentioned above tends to be east-south-easterly.

The lower sections of the valley tend to have a more dominant

prevailing wind direction down the valley towards the sea. This is partially a result of the winds along the shoreline blowing almost perpendicular to the axis of Waimea Valley thus drawing the wind out of the valley.

The temperature range in Waimea Valley is also indicative of the climatic conditions. The upper valley areas tend to be from 2° to 3° cooler than the temperature of the lower section at any corresponding time. Temperature average for the valley is approximately 74° F.

Storm Drainage and Water Runoff

During the winter and early spring, heavy rain storms have created a flooding condition in Waimea Valley at an average of two to three times per year. Due to the heavy rainfall and abundance of soils which have high runoff characteristics the Kamananui, Elehaha, and Kaiwihoele Streams feed a tremendous amount of water into the Waimea River. If the river mouth to the ocean is not open to flow into the sea, (on some occasions high surf has piled sand across the river mouth forming a barrier) the river has a tendency to back up the valley and cause flooding of the lowlands. The Park was closed to the public on three occasions during the winter of 1973 - 1974 due to flooding of a lower section of the entry road as a result of the river backing up.

Flooding has not been a problem in the area of the park visitor facilities, as appropriate drainage work was done at the time of construction. Due to the location of the nursery and other support structures, stream overflow has not caused any damage other than limited bank erosion and uprooting of some growth along the stream banks.

Flooding in upper sections of the valley does not occur due to the grades and topography of the area. All runoff flows directly into streams, which increase in size considerably. Where service roads cross streams a combination culvert and ford system is used to handle an unlimited volume of water at these points.

Flora

To the layman the forested areas of Waimea appear very lush, tropical and beautiful. A large percentage of the valley is characterized by very heavy mountainous vegetation, with an abundance of large trees such as monkey pod, koa, kukui and hau. The stream beds and adjoining slopes are profuse in vegetation, while other areas are open and consist primarily of various types of grasses.

To the botanist, the flora of Waimea has been reduced during the last century to a "weed forest", mainly composed of guava (*PSIDIUM guajava*), lantana (*LANTANA camara*), java plum (*EUGENIA cumini*), Christmas berry (*SCHINUS terebinthifolius*), haole koa (*LEUCAENA leucocephala*), lilikoi (*PASSIFLORA edulis*), kolomana (*CASSIA surattensis*) and assorted herbaceous weeds. Of the native species, only the following are found in any quantity. Koa (*ACADIA koa*), ohia lehua (*METROSIDEROS collina*), noni (*MORINDA citrifolia*) wili wili (*ERYTHRINA sanwicensis*), Hawaiian tree fern (*CIBOTIUM camissoi*), ti (*DRACAENA terminalis*), halapepe (*DRACAENA aurea*), hala (*PANDANUS ordoratissimus*), and kukui (*ALEURITES moluccana*).² For a more complete listing of flora found in Waimea refer to addendum #2.

² Flora and Fauna report prepared by Waimea Arboretum staff is attached as Addendum 1.

FAUNA

At present the species of native birds found in Waimea Valley included the following: Elepaio (*CHASIEMPIS sanwicensis*), Amakihi (*LOXOPS virens*), Apapane (*HIMATIONE sanguinea*), Gallinule (*GALLINULA chloropus*), Owl (*ASIO flammeus*), Auku'u (*NYCTICORAX*), and Koloa Maoli Duck (*ANAS platyrhynchos wyvillina*). The introduced birds that inhabit the valley are - Mynah (*ACRIDOTHERES tristis*), Barred Dove (*GEOPELIA striata striata*), Spotted Dove (*STREPTOPELIA chinensis chinensis*), Coot (*FULICA americana*), Ring Necked Pheasant (*PHASIANUS colchicus*), House Sparrow (*PASSER domesticus*), White Eye (*ZOSTEROPS palpebrosus japonicus*), Shama Thrush (*COPSYCHUS malabaricus*), Plover (*PLUBIALIS dominica fulva*), Cardinal (*RICHMONDENA cardenalis*), Brazilian Cardianal (*PAROARIA cucullata*). The following have been introduced for visitor interest: domestic ducks, geese, peacocks, guinea fowl and the Moa Chicken.

UTILITIES

All utilities that presently run to the visitor facility are underground. The electrical lines follow the entry road from the highway and go underground approximately $\frac{1}{4}$ of a mile from the facility. Water is brought in from the city water line on Kamehameha Highway through a four inch water line that provides good water pressure to all areas of the arboretum and visitor facilities.

The cooking equipment in the food facility is gas operated, and serviced by a gas tank near the loading dock area.

Cultural and Historical Characteristics

Culturally and historically, Waimea Valley has played an important role in Hawaii's past. Remnants of Waimea's agricultural past were uncovered by the Bishop Museum field team during their recent archaeological survey. These findings are all recorded in their publication "Archaeological Survey of Lower Waimea Valley, Oahu". Also prepared by the Bishop Museum is "The History of Waimea Valley, Oahu". A copy of each of these publications is included in this report as addendums 3 and 4, to provide an in-depth presentation of the history and culture of Waimea Valley.

CHAPTER III

ENVIRONMENTAL IMPACTS OF AND DETAILED DESCRIPTION OF PROPOSED PROJECTS

Additional Parking Area

The proposed parking plan would provide parking for approximately 100 additional cars. This area would be located about one half mile off Kamehameha Highway and just makai of the new park facilities (See Exhibit 2). The area affected would be about 4 acres, and of this area a large percentage would be landscaped as noted in Exhibit 2. An existing low area filled with large rocks would become a rock garden within the parking layout. Pathways into and out of the parking would be heavily landscaped. The existing entry road, where it curves around the north side of the proposed parking area would become one-way moving out of the park. The new road alignment would border the southern edge of the proposed parking area and would be designated for one-way traffic flow into the park. Picnic areas would be created along the stream bank area between the new entry roadway and Kamananui Stream.

At present the area designated for this parking is dominated by high grass, small shrubbery, and is primarily open. In the past, two old shacks, a rubbish dump and grove of Hale Koa was cleared from this area in the interest of cleaning up and enhancing the entry to the Park facilities. The only trees found in this area are in the rock garden and picnic areas and would remain. No tree removal would be done.

A minimum of ground work and grading would be required as the area is level and clean of large rocks. Crushed coral would be the desired material for the parking areas, but if this does not prove

feasible, asphalt paving would be used. The landscaped rock garden area would require a 24-inch drainage pipe under the entry road for drainage into the stream during high rain fall periods.

Environmental Impact

Short term impact of the proposed parking area would consist of (1) noise and dust pollution during construction, and (2) removal of existing flora resulting in increased erosion before new grass and landscaping is accomplished. The soil found here is classified as Hanalei silty clay, having moderate permeability, slow runoff, and slight erosion hazard.³

The long term environmental impact of the parking area would most likely relate to traffic and water runoff. More parking will allow more people to visit the park. A substantial increase in cars could have an effect on air quality and noise level in the parking areas, however, the prevailing wind conditions of the valley will tend to alleviate all pollutants. The projected increase in traffic due to the expansion of the Park facilities would, in all probability, not be great enough to have a measurable effect over and above the air and noise pollution levels presently experienced. There is no visible air pollution in Waimea Valley now, and due to low speed of travel over the entry road, noise is very minimal.

The topography of this area is predominantly level with the existing low section at the rock garden area. Much of the area bounded by the

3

Soil Survey - U. S. Department of Agriculture Soil Conservation Service.

proposed ingress and egress road pattern presently drains into this low section. As mentioned above, this low section will be drained by a 24-inch culvert under the ingress road. This culvert empties onto the heavily grassed, sloped bank of the stream. The areas along the stream to the south, southwest, and west of the proposed ingress road gradually slope towards the stream and any runoff from these areas flows into the stream. There has not been a flooding problem in these areas in the past, and it is not anticipated that any flooding or drainage problems will occur due to the proposed change.

Alternatives

Following are possible alternatives to the above:

(1) The entry road shoulders could be widened to provide road side parking, but this would be undesirable for several reasons. As opposed to alleviating traffic congestion this would create congestion and a potentially hazardous condition. It would also prevent proper landscaping of the roadside, thus detracting from the natural beauty of the area. Parking on the shoulders would tend to cut and breakdown the roadside; causing high maintenance and creating an unsightly area.

(2) The other alternative would be to make no attempt to provide additional parking. This would be least desirable as "overflow" parking would continue to increase along the roadside areas, thereby creating a serious traffic hazard. Problems similar to those with alternative one (1) would also be present.

Proposed Restaurant

The proposed restaurant would be located on the second floor of the new visitor center. The area involved is presently an open room 60 feet long and 36 feet wide (2,160 square feet) with windows along one side and 3 sets of double doors on the other, opening out to a lanai 12 feet wide running the length of the room. The present kitchen, located below the makai end of the space, would be utilized for food preparation.

The type of restaurant best suited for this location would be a medium priced, high quality, steak and seafood operation, serving both lunch and dinner. A full liquor license would be required for the serving of cocktails. Hours of operation would conceivably run 11:00 a.m. to 2:00 p.m. and from 5:00 p.m. to midnight. Total seating capacity would be from 140 to 180 persons at any given time, depending on the final design. Operation of the restaurant would be under Bishop Corporation's control.

Environmental Impact

The short term environmental impact would be in the form of construction noises resulting from necessary interior work. Human resources would be utilized in the form of man hours expended to accomplish the design work and interior construction.

Long term effects on the environment would be:

(1) Increased operating time in the kitchen (9 hours to 15 hours) would create a greater amount of kitchen discharge through its exhaust system - primarily hot air.

(2) Noise pollution during evening hours would be a factor, as the normal sound level created by a medium-sized restaurant would be audible in the immediate area of the visitor facility. This, however, would not be significant.

(3) The restaurant would contribute to increased traffic to the visitor center during the noon and evening hours. This increase can easily be handled by the entry road, although the parking area may be overburdened during the noon hour. Parking is covered in this report under the section headed Additional Parking Area.

(4) Greater amounts of water, electricity and gas will be consumed as a result of an operational restaurant. Resources are presently available at the location to meet all restaurant needs.

There are no private residences less than one-half mile from the park facilities, and the effect of these environmental factors would certainly be negligible. Likewise, the recreational value of the park would in no way be hampered.

Alternatives

Alternate uses for the space would be display area, a meeting hall made available to various community organizations, or to remain vacant. However, none meet the needs of the local community or visitor, as does the restaurant use.

Arboretum Improvements

The need for additional arboretum facilities, and ability for expansion of botanical gardens and landscaping, has been explained in

the section headed General Description. The construction of the six following structures in the Arboretum is necessary:

- (1) Office, lecture and display building: An enclosed area of 60 feet by 16 feet to include an office/library; herbarium (herb storage); restroom facilities; shower facilities; laboratory; and employees lounge. A 16 foot wide lanai for demonstrations and lectures would run the length of the structure. The total size of the building would be 60 feet by 32 feet or a total of 1,920 square feet. The building would be constructed of materials found in the visitor facility, and maintain the same architectural style. The present office is a converted trailer of approximately 200 square feet. This old vehicle houses all records and administrative work done by the Arboretum staff. With desk space a necessity, very little room for movement exists and administrative expansion is difficult.
- (2) Seedling house: This structure is used for the growing of delicate seedlings where birds, rats and other creatures cannot destroy them. It would be 10 feet by 24 feet or 240 square feet; on a cement slab, with wire mesh on four sides and in lieu of a roof. Further, it contains a spray-mist irrigation system to keep seedlings moist.
- (3) Saran house: The purpose of this structure is to control conditions of moisture, wind and light in order to promote seedling growth prior to planting. It would be 100 feet long by 50 feet wide or 5,000 square feet. Some sections would be of lath material, others of screen or fine wire

mesh. Roofing material that reduces sunlight and allows passage of moisture would be utilized. Plant stands on concrete slabs would be accessible through a system of gravel walkways. A spray-mist irrigation system would provide moisture in addition to natural rainfall.

- (4) Potting shed: A 30 foot by 24 foot area of 720 square feet. The structure would have a slab foundation, roofed with translucent material posted at corners and open on four sides. Its purpose is the potting of seedlings prior to being placed in the Saran house.
- (5) Storage shed: An enclosed wood frame storage shed for tools, fertilizers, etc., and 10 feet by 20 feet or 200 square feet. It would be a concrete slab with wood siding and an asphalt tile roof.
- (6) Plant quarantine house: To be used for temporary storage of plants or seeds, from foreign countries, during the quarantine period to determine if any insects or diseases have been transported. It will be 35 feet by 14 feet or 490 square feet. Mr. Charles Yasuda, head of Plant Quarantine for the State of Hawaii, suggested the house have at least two separate rooms, with access through a hallway (painted black) long enough to prevent two doors being opened at one time. The two rooms would be separated by a dark area. The structure will be on a concrete slab (with a drain sump) and roofed with clear corrugated plastic. The walls would be a combination of hollow tile and two types of wire mesh.

All the above structures will be located within the existing

nursery area and will not be readily visible from any other area of the park.

The nursery presently has the electrical power and water necessary to meet its expansion needs. It should be noted that no material belonging to the Waimea Arboretum will be commercially sold, but rather maintained for the sole purpose of the viewers enjoyment. Presently no restroom facilities are available to the staff or arboretum visitors.

The soil type in this area is classified as Kawaihapai clay loam with a moderate permeability rating, according to the August 1972 Soil Survey by the U. S. Department of Agriculture Soil Conservation Service. Under category heading "degree and kind of limitations for septic tank filter fields", the soil survey renders a rating of "slight, on slopes of 0 to 7 percent" for this type of soil. The Arboretum office is to be located on level ground and due to the acceptable soil permeability at this location and no drinking water sources within the vicinity, a cesspool⁴ would be utilized for sewerage disposal from the office restroom and shower facilities.

As the area these structures are to be located is predominantly level, little or no grading will be necessary. The areas involved are currently the center of the Arboretum operation and also would require no clearing.

Environmental Impact

The only short term impact would be construction noises generated by the requisite construction process. Most of the construction would

⁴
Recommended by William Hee of William Hee and Associates, Engineers.

be accomplished by the arboretum staff (with the exception of the office facility) over a period of time. This tends to prevent any significant disruption of normal operation due to construction.

The long term environmental impacts would be as follows:

(1) The depletion of resources would be very minimal as the amount of electricity and water consumed would not greatly exceed current usage.

(2) Seepage of sewerage would not result in any form of measurable pollution. As noted above, the soil in this area is of a moderate permeability, thus able to give good percolation and thereby provide the natural capability of disposing of the small amount of projected sewerage. There are no drinking water sources in the area, so threat of underground water pollution would not be a factor. Elehaha Stream, which runs on an average of about 18 days of the year, is located approximately 150 feet from the office.

(3) Water runoff for the soil type in the nursery area is noted as 'slow' and erosion hazard slight. During heavy rainfall periods, the runoff from the Arboretum area drains directly into Elehaha Stream as does the runoff from the steep hill area directly behind the Arboretum. The total roofed area of 3,330 square feet represents a small percentage of the many acres in the immediate area that drain directly into Elehaha Stream. A culvert-ford system has been constructed at the junction of Elehaha and Kamananui Streams to handle the heavy flow periods.

(4) Traffic: As the Arboretum and botanical gardens expand and become a more well known attraction, an increase in traffic to the area will be realized. The capacity of Kamehameha Highway at Waimea

Valley does, on few occasions, approach a congested state. This presently happens during periods of high surf on weekends. At all other times the traffic flow past Waimea Falls Park is unhindered. The expansion of the Arboretum facilities and botanical gardens could not generate enough increase in traffic to cause congestion on Kamehameha Highway.

The major long term impact on the surrounding valley areas will be through the planned growth of the botanical gardens, landscaping of areas that are presently haole koa and scrub brush, reintroduction of Hawaiian endemic species that have disappeared and propagation of rare and endangered species of plants.

Alternatives

There are two alternatives to development of the Arboretum facilities as proposed: (1) continue with the present inadequate facilities, or (2) partial development of the facilities. Either of these alternatives would prohibit the Arboretum from achieving its stated objectives.

Vacation Cabins and Campsites

It is the intent of Bishop Corporation to create at Waimea Falls Park, a recreational atmosphere for both tourists and local visitors. In order to give local people the optimum recreational opportunity, not more than twelve (12) cabin cluster locations and many cleared areas for camping are made a part of the Master Plan.

Of the twelve cabin cluster locations, nine (9) will be located up the north valley. Six (6) of these clusters will be located along the existing roadbed and trail, while three (3) will be located along

Drum Road (a private road) leading to the property's Pupukea boundary. These nine (9) areas would be the first completed at the time Bishop Corporation elects to implement this concept. The three (3) remaining cabin clusters would be located on the south side of the property; two (2) just mauka of the waterfall and one further mauka on Drum Road. As stated in other sections of the report, each cluster will contain no more than ten (10) vacation cabins. The number will depend on the topography of the specific site.

Within each cluster the cabins would be situated so as to provide maximum privacy, each having its own location, and whenever possible be out of sight of any other cabin.

All cabins will be for vacation and recreational purposes. No cabin will contain more than eight hundred square feet of gross floor area or more than four (4) sleeping rooms. All would be one level, require minimal grading, and in an architectural sense, rustic. Other than a possible concrete slab, again depending on topography, all cabins would be constructed of heavy timbers and rough-sewn materials.

Access to all cabins would be by a trail network, or by Drum Road. All trails and the road would be maintained by Park personnel, who would also provide the necessary safety and security functions.

Cabins located on the north side of the valley will draw necessary water needs from a 50,000 gallon holding tank (approximately 10 feet by 40 feet). The holding tank will be located on the property and be fed by a metered line leading from the existing Board of Water Supply tank, located near the top of Pupukea Road, just makai of the Boy Scout Camp. Such action would, of course, require Board of Water Supply approval. As an alternative, the cabins could draw water, via

a main line extension, from the base facility, which is fed by a four (4) inch main leading from Kamehameha Highway. Assuming all of the aforementioned clusters contain the maximum of ten (10) cabins, and an occupancy of four (4) people per cabin, a daily use of 36,000 gallons is anticipated. The two clusters located makai of the waterfall will draw water from the stream via a properly screened deep pumping system. The extreme mauka cluster will draw water from a holding tank, kept full by trucking water to that location.

In terms of electricity, should Bishop Corporation elect to provide such, cabins on the north side of the valley would be serviced by a 2½ inch, 12,000 volt line. Each cluster would have its own small transformer taking electricity off the main line to the individual cabins. As an alternative, a generator would be provided for each unit, but besides being expensive, it is a noisy alternative requiring heavy service and maintenance. Cabins on the south side of the valley would not be serviced with power.

All cabin clusters would be hooked up to a sewerage system, composed of approximately three (3) cesspools per cluster of cabins. Each cesspool would approximate eight (8) feet in diameter, and its depth would depend on the soil's permeability. According to William Hee and Associates, Inc., Civil Engineers, the amount of seepage would be insignificant in relation to the amount of area in question.

Environmental Impact

The only possible impact of a short term nature would be a small amount of noise created during construction. Since there are no residents at all in the area, this should not be considered a factor.

Since clearing would be limited and carefully managed, there will be no displacement of flora, other than hale koa and scrub brush.

All cabin locations will be in a remote area, and impact on the environment is minimal. There will, of course, be a transient population in the valley; either campers or people in the cabins. It is not felt that noise generated by users will be a factor and there will be only a minimal depletion of resources in the form of electrical and water consumption. The most significant long term impact is a very positive one, in that new facilities will be created for those seeking to experience the beauty of a valley environment. Camping facilities on the island of Oahu are very limited, and the creation of vacation cabins and camping sites for public use are certainly warranted and an asset to the community.

The only alternative to providing vacation cabins, whether they be with or without electrical power, such as those in the State park systems, is not to provide cabins. Such an alternative, however, does not allow for the development of a complete master planned recreational park. Further, the recreational potential for public enjoyment would be lost.

Hiking Trails

Hiking trails throughout the Park area would do much to expand the recreational use of Waimea, and make available to the public the natural beauty of the mountains and valleys therein. Presently hiking routes within the park boundaries total approximately eight miles, of which, Drum Road and the abandoned roadbed up the north valley make up the majority. Actual trail miles are less than half of this number.

Bishop Corporation proposes to clear hiking trails up the north valley following Elehaha Stream to Drum Road; up the south valley following Kamananui Stream to Drum Road; and mauka of Drum Road up into the more remote upper sections of Waimea. There is presently a trail to the ridgeline dividing Waimea Valley; and out to the promontory point overlooking the park facilities and the lower valley. A total of approximately twelve additional miles of trails would be added. In addition, there will be a network of smaller trails connecting major trails and leading to points of interest.

The trails would be marked in a manner similar to Hawaii State Park trails. Distances would be noted and trails would be keyed to a trail map illustrating the layout and routes of all trails.

Only necessary clearing to make trails passable and distinguishable would be done. A trail crew would be utilized for maintenance of the trails and to assist any hikers in need of help. A radio-telephone communication system would be established to control points throughout the valley.

Environmental Impact

The environmental impact of hiking trails would be limited to the impact that the presence of hikers would have on the flora and fauna of the particular area. A great majority of the Park area would not be accessible from the proposed trails, therefore limiting any impact the presence of hikers would have. Due to the vast area of Waimea Falls Park - over 18,000 acres - it would be inconceivable that the presence of hikers, who normally tend to be conservationists, would have any long term effect on the environment.

Alternatives

The only alternative to providing hiking trails would be to leave the area in its present state and prohibit any hiking in the area. Waimea Valley has a lot to offer those hiking through its many areas, and to prohibit such activity would be a loss.

Transportation System

The master plan calls for a transportation system which provides public access to the north valley. Currently, there are two systems of transportation under consideration, in order that visitors are better able to view the many facets of this lush area. The system used would also serve as a means of servicing and maintaining the cabin and campsite areas. A tracked or wheeled vehicle system would fill this need.

The system would run from the vicinity of a meadow located near the maintenance building to the area where Drum Road, which crosses the mauka section of the property, bisects the north valley and crosses the Elehaha Stream. This would be a distance of approximately two miles, resulting in a four mile round trip.

The proposed route follows an old dirt roadbed that at one time carried vehicle traffic up to Drum Road. Some sections of the road are overgrown and others have been washed out at stream crossing locations. Fords were constructed at some of the stream intersections using concrete and rock and in one location a bridge was constructed over a low section of the streambed. The applicants' proposal entails clearing the roadbed to a 12 foot width where necessary, and then

progressing with required renovations. Pull-off areas would be located at the points of interest along the route for observation and passing of vehicles. The slope averages approximately 5% up the valley, with no section in excess of a 10% grade.

Very little grading and filling would be required to renovate the roadbed for wheeled vehicle use. Many sections are usable in their present condition and are ready for a base course and paving. Without a paved surface, passage would be almost impossible due to slippery mud conditions, and washout problems. As an alternative, a narrow gauge track would require more grading and fill to provide a more uniform slope, and trestles would be required over stream crossings. Unlike a wheeled system, a track system would require a much narrower roadbed.

Should wheeled vehicles be utilized, they would be similar to those now carrying people to the Falls area. Should the track system be selected, the train would be such that noise and air pollution would be minimal.

Environmental Impact

The short term impact would include the noise and exhaust created by equipment used in preparing and paving the roadbed. The disturbance and removal of flora would be minimal as clearing would require only a trimming of encroaching growth.

The long term impact would vary with the type of system utilized. The minimal displacement of flora would be similar in both cases; and noise levels would be higher with a train than with wheeled vehicles. Air pollution would be minimal due to the amount of usage in relation

to the park area. Regardless of which system is utilized, its impact on the environment will be carefully analyzed, as Bishop Corporation will not jeopardize its goal of achieving a properly planned recreational park.

Water runoff patterns would not be altered significantly as the soil (Helemano silty clay) found in most of this area has a medium to very rapid runoff characteristic. A paved roadway would create more runoff than a bed for a track system. The natural drainage system throughout this valley would not be taxed by the slight increase resulting from a paved or compacted roadbed.

Alternatives

A train system would be a feasible alternative to a roadway for wheeled vehicle use, for several reasons: (1) Trains have played an important part in Hawaii's history and (2) it would be a unique recreational opportunity not found in this context elsewhere in Hawaii. Although a more costly system, the overall long-range environmental impact may be slight once the cut and fill areas are landscaped and mature growth obtained.

Water Control

As part of its Master Plan concept, Bishop Corporation has endeavored to find a solution to the problem created by a lack of rainfall. During such periods all running water stops and Waimea Falls has no cascading water. Due to the nature of the soils at Waimea Falls Park, the environmental factors, and the inhibiting

expense, the concept of a dam has been eliminated. However, Bishop Corporation, as part of its plan, would like to continue the search for developing a water control system capable of insuring an adequate flow of water over Waimea Falls.

CHAPTER IV

COMMUNITY EFFECTS AND IMPACT

Due to its size, Waimea Falls Park can only be a long range project; the only anticipated long range function or projected use being further development of a recreational park. This would preclude any optional uses for future choice or implementation. Since it is a conservation district, no other use would be appropriate for Waimea Valley. Some of the proposals covered in this impact statement are looked at for long range implementation, others for immediate implementation. For example, Bishop Corporation envisions the creation of botanical gardens and park landscaping as a continuing process, whereas expansion of the parking area would be completed within the near future.

A park and arboretum/botanical garden of this magnitude will create many jobs for residents of the north shore area. Such employment will be beneficial to the economy of the north shore area, as the annual payroll presently exceeds \$250,000.

Another benefit to the community of park expansion, is the educational, cultural, and recreational opportunities that will become available. Included would be the expansion of public awareness towards Waimea's cultural and historical heritage.

Recreational opportunities that are not available elsewhere on Oahu would be found at Waimea; including hiking to, and staying in cabins. Miles of hiking trails would be easily accessible and would take hikers through some of the most beautiful of forested areas. Also easily accessible and safe would be the camping areas scattered throughout the park. All these would be an asset and of benefit to the community.

Residents of the community would also benefit from the availability of a high quality, moderately priced restaurant located in a beautiful, peaceful setting.

The educational benefits of the expanded botanical gardens, and the propagation of a multitude of plant species are limitless. The benefits range from that of scientific interest to one of public awareness and appreciation for the many species of plants and flowers found in Hawaii, and from other parts of the world. Presently, with the limited arboretum/nursery facilities, different schools and organizations are showing interest and have toured the facilities. Most of these groups have been school children.

The only direct effect of expanding the park facilities that could be considered a non-benefit to the community, would be a possible increase in vehicular traffic to the north shore area. A direct parallel to this may be drawn from the experience of Sea Life Park in Waimanalo and of the Polynesian Cultural Center in Laie. Like Waimea, both these projects are located in sparsely populated areas that are serviced by a two-lane, undivided highway with a rated capacity of considerably more traffic than is generated by the local community. These projects draw many vehicles on a daily basis; but, by nature of their activities, any possible traffic increase is spread over a 10 to 12 hour time span. This precludes any measurable increase in the traffic burden during peak hours. As a result, the highways concerned still experience considerably less traffic than their rated capacities, and continue to provide class 'C' or better service, as defined by the State Highway Planning Department.

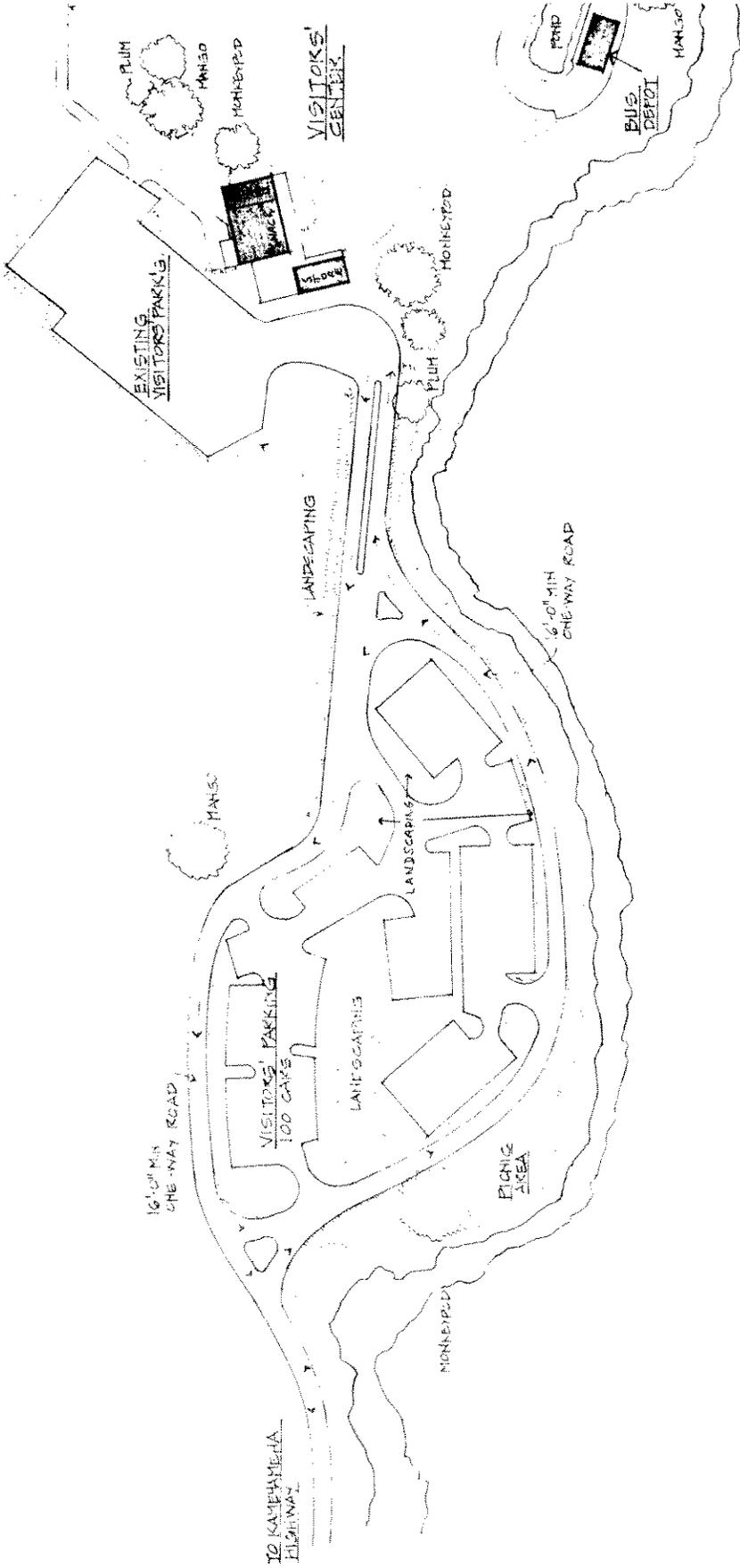
Waimea Falls Park, as it relates to traffic, is very similar to the above mentioned parks. Further, a vast majority of the people

visiting the park are driving around the island, and Waimea Falls Park is but a stop and relaxing respite from that drive. The park is well off Kanehameha Highway, and in no way adds to the traffic burden or environmental problems which currently exist.

Agencies and Bibliography

1. United States Department of Agriculture - Soil Conservation Service Survey - 1972.
2. United States National Weather Service, Honolulu.
3. United States Department of the Interior Geological Survey, Waimea Quadrangle, Hawaii - City and County of Honolulu, Island of Oahu.
4. United States Hydrographic Office, Kamananui Gauging Station.
5. State Highway Planning Department.
6. Bishop Museum, Honolulu, Hawaii.
7. William Hee and Associates, Inc. - Engineers.
8. Waialua Sugar Plantation, Rainfall Data.
9. Waimea Arboretum, Flora and Fauna of Waimea.
10. Volcanoes in the Sea - Geology of Hawaii, Abbott and MacDonald.
11. Personal Observation of Long-Time Residents of the Waimea-North Shore Area.

EXHIBIT #2



PLAN - PARKING



ADDENDUM 1

Introduction - Flora and Fauna report from Waimea Arboretum - Addendum 1

The following report is based upon personal observations of the undersigned, discussions with State Fish & Game, Forestry officials, discussions with local residents of the area, and reference to various books and reports on the natural history of Hawaii.

Flora-

Basically, the flora of Waimea Valley has been reduced during the last century to a "weed forest", mainly composed of guava (PSIDIUM ~~guajava~~), lantana (LANTANA camara), java plum (EUGENIA cumini), Christmas berry (SCHINUS terebinthifolius), haole koa (LEUCAENA leucocephala), lilikoi (PASSIFLORA edulis), kolomana (CASSIA surattensis) and assorted herbaceous weeds. Of the native species, only the following are found in any quantity. Koa (ACACIA koa), ohia lehua (METROSIDEROS collina), noni (MORINDA citrifolia), wili wili (ERYTHRINA sandwicensis), Hawaiian tree fern (CIBOTIUM camissoi), ti (DRACAENA terminalis), halapepe (DRACAENA aurea), hala (PANDANUS odoratissimus), and kukui (ALEURITES moluccana).

Fauna -

Birds -

At present the species of native birds found in Waimea Valley include the following - elepaio (Chasiempis sandwichensis), amakihi (Loxops virens), apapane (Himatione sanguinea), gallinule (Gallinula chloropus), owl (Asio flammeus), auku'u (Nycticorax), koloa maoli duck (Anas platyrhynchos wyvilliana) - Introduced by Waimea Falls Park as part of endangered bird preservation program. The introduced birds that inhabit the

valley are - Mynah (*Acridotheres tristis*), barred dove (*geopelia striata striata*), spotted dove (*Streptopelia chinensis chinensis*), coot (*Fulica americana*), ring necked Pheasant (*Phasianus colchicus*), house sparrow (*Passer domesticus*), white eye (*Zosterops palpebrosus japonicus*), shama thrush (*Copsychus malabaricus*), plover (*Plubialis dominica fulva*), cardinal (*Richmondena cardenalis*), Brazilian cardinal (*Paroaria cucullata*). Introduced for visitor interest, domestic ducks, geese, peacocks, guinea fowl and Moa chicken.

Mammal -

The only animals now existing in the valley are - Feral pigs (*Sus scrufa scrofa*), feral goats (*Capra hircus*), feral cats (*Felis catus*), mongoose, rats and mice.

ERLING W. HEDEMANN, JR.

23 yrs. Nursery, Landscape Contracting - 3 yrs. Landscape Architect - presently serving on Architect, Engineers, Land surveyers, and Landscape Architect board. 2 yrs. Director, Waimea Arboretum.

KEITH R. WOOLLIAMS

2 yrs University of London Botony Stn., England - 2 yrs. Horticulturist, Bermuda - 2 yrs. Curator, Lae Botanic Gardens, New Guinea - 3 yrs. Horticulturist, Pacific Tropical Botanical Gardens, Kauai - 6 mo. Horticulturist, Waimea Arboretum.

MARLEEN DAVIS

6 yrs. Nursery, Landscape Design and Contracting - 2 yrs. Senior Assistant to the Director of Waimea Arboretum.

Summary .-

The purpose of this project is one of conservation, the re-introduction of native flora, the preservation of endangered species of the world, and establishment of a living gene pool of sub-tropical and tropical plants. An example of Arboretum projects now underway is the re-introduction of Hibiscus Youngianus, and after an absence of many years, research into re establishment of the Sandalwood, and propagation of many native Hawaiian plants facing extinction.

Literature references -

Mary Neale, Rock, St John, Hawaii's Birds (Audubon Society) and Bishop Museum Archiological survey report.

Ernestine
A.R. Wallis
Mareen Davis

ADDENDUM 2

A SUMMARY OF THE EXISTING FLORA - WAIMEA VALLEY - 1974 - ADDENDUM 2

FILICES

Cibotium Chamissoi (Hawaiian Tree Fern)
Nephrolepis exaltata var. *bostoniensis* (Boston fern)
Pteridium aquilinum var. ? *decompositum* (Bracken fern)
Sadleria cyatheoides (Hawaiian Tree Fern)
Other introduced ferns also exist.

PSILOACEAE

Psilotum Nudum (moa)

GRAMINEAE

Digitaria spp.
Heteropogon contortus (pili grass)
Melinis minutiflora (molasses grass)
Oplismenus hirtellus (honohono-kukui)
Paspalum spp.
Panicum spp.
Setaria palmifolia (palm grass)
Other introduced grasses also exist.

PALMAE

Cocos nucifera (coconut)

LILIACEAE

Dracaena aurea (halapepe)
D. terminalis (ti)

ANACARDIACEAE

Schinus terebinthifolius (Christmas berry)

COMPOSITAE

Bidens pilosa (spanish needle)
Pluchea indica (Indian fleabane)

EPACRIDACEAE

Styphelia tameiameia (pukiawe)

EUPHORBACEAE

Aleurites moluccana (kukui)
Euphorbia peplus (petty spurge)
E. hirta. (garden spurge)
Phyllanthus niruri (niruri)
Ricinus communis (castor bean)

GOODENIACEAE

Scaevola gaudichaudiana (Mountain naupaka)

LEGUMINOSAE

Acacia Koa (koa)
Cassia leschenaultiana (Japanese tea)
Crotalaria mucronata (smooth rattlepod)
Desmodium sandwicensis (Spanish clover)
Erythrina sandwicensis (Wili-wili)
Indigofera suffruticosa (indigo)

Leguminosae.. Cont.

Leucaena leucocephala (Haole koa)
Mimosa pudica (hilahila)

MALVACEAE

Abutilon molle (hairy abutilon)
Hibiscus tiliaceus (hau)
Thespesia populnea (milo)

MYRTACEAE

Eugenia cumini (Java plum)
Metrosideros collina (ohia)
Psidium cattleianum (Strawberry guava)
P. Cattleianum forma lucidum
P. guajava (guava)

NYCTAGINACEAE

Mirabilis jalapa (four o'clock)

OXALIDACEAE

Oxalis corniculata (yellow wood sorrel)

PANDANACEAE

Freycinetia arborea (ieie)
Pandanus odoratissimus (pandanus)

PASSIFLORACEAE

Passiflora edulis (passion fruit)
P. edulis forma flavicarpa (lilikoi)
P. foetida (scarlet fruited passion flower)
P. suberosa
P. subpeltata (white passion flower)

PIPERACEAE

Peperomia leptophylla
P. sp.

PORTULACACEAE

Portulaca oleracea (purslane)

PROTEACEAE

Grevillea robusta (silky oak)

ROSACEAE

Osteomeles anthyllidifolia (ulei)

RUBIACEAE

Morinda citrifolia (noni)

THYMELAEACEAE

Wikstroemia sp. (akia)

VERBENACEAE

Lantana camara (lantana)
Stachytarpheta jamaicensis (Jamaica vervain)
S. urticaefolia (nettle leaved vervain)

ADDENDUM 3

ARCHAEOLOGICAL SURVEY OF LOWER WAIMEA VALLEY, OAHU

by

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and

MARGARET L. K. LUSCOMB

Prepared for

BISHOP CORPORATION

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June 1974

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ABSTRACT

An archaeological Phase I survey of lower Waimea Valley was conducted by Bishop Museum personnel during April, 1974. Thirty-two sites were recorded, including thirteen agricultural sites, seven historic complexes, three burials, two wall complexes, and one rock-shelter habitation. Four additional sites designated the location of portable artifacts, while the remaining two sites identify a Japanese shrine (D7-13) and a possible Hawaiian shrine (D7-23). Test excavations were conducted to investigate a lens of charcoal-laden soil on a slope near site D7-23. These excavations revealed that the deposits are historic and that the possible shrine may be partially buried by these recent soils. Sites D7-23 and D7-16 (an agricultural complex) have been placed in Category I and are sufficiently important to become focal points of planned park development.

ACKNOWLEDGMENTS

We would like to thank Mr. Charles Pietsch III of the Bishop Corporation for his keen interest and support of our program during the survey. We would also like to express our appreciation to Waimea Falls Park Manager Bob Leinau; to Assistant Manager Tom Shaw, and to the park staff, for their cooperation and assistance. Special mention must be made of Office Manager Jeri Wright, who so graciously made her house available to us during the field work in the valley. To the park arboretum crew, supervised by Ehrling Hedermann and Marline Davis, our special thanks for clearing work and botanical information so freely given.

We acknowledge the contribution of our field crew, who were a pleasure to work and live with: Elaine Rogers, Paul Cleghorn, Maile Moore, and Jenny Peterson.

Those at the Bishop Museum who were instrumental in the preparation of this report include: Dr. Yosihiko H. Sinoto, Chairman, Department of Anthropology; Patience Bacon, Secretary; Mary Judd and Janet Gordon, information and advice; John McLaughlin, drafting; Bonnie Clause, editing. Dr. Patrick McCoy assisted us in the selection and interpretation of text excavations. To each of these persons, we wish to say "mahalo nui loa".

Our special acknowledgment to Lief Andersen, who made available to us his personal artifact collection for examination and description in this report.

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INTRODUCTION

This report presents the results of a Phase I archaeological survey of lower Waimea Valley, Oahu, conducted by staff members of the Department of Anthropology, Bernice P. Bishop Museum. The work was done under contract from the Bishop Corporation.

The area surveyed (Zone 1) includes the lower valley from the Waimea River Bridge on Kamehameha Highway to just above Waimea Falls. The valley at this point is bifid--divided by a central ridge called Kaluahole. The falls lie in the S valley, which contains the perennial stream Kamananui. The N leg of the valley has an intermittent stream, originally named Kamaaiki and now called Elehaha. The length of the surveyed area is approximately 1.5 miles (2.46 km), and it is about 0.5 mile (0.86 km) wide (Fig. 1).

Vegetation in the survey area includes: 'ape, Chinese banyan, banana, bird's nest fern, bamboo grass, breadfruit, basket grass, coffee, Christmas berry, coconut, chili pepper, cat's claw, four o'clock, guava, false *honohono* grass, *haole* koa, *Cayenne vervain*, Java plum, *kukui*, castor bean, *laua'e*, *liliko'i*, lime, lantana, mango, monkeypod, morning glory, *noni*, orange trees, papaya, *Passiflora* sp., sword fern, shampoo ginger, strawberry guava, ti, false wiliwili.

FIELD METHODS

Field work was conducted from March 25 to May 3, 1974; during this time 32 sites were located, described, and recorded by a crew of five under the direction of the senior author. Test excavations at site D7-23 (authorized by Mr. Charles Pietsch III) extended our time in the field through May 9.

Sites were located by walking through given sections of the valley in a line abreast; the spacing depended upon topography and the density of the vegetation encountered. In very dense areas, a zigzag pattern was used to increase our individual coverage of the area. Located sites were plotted in relation to the previously established datum points, which were keyed to a master overlay of the survey area. This method allowed rapid and accurate site location in areas where few landmarks were visible. Several sites are located in relation to established transit points. Transit lines were tied into a central datum near the equipment shed in the N valley. Distances in meters from this and indicated secondary datums are given so: M 360 = 360 meters from the central datum. The S valley has sufficient physiographic features so that this system was not necessary, but the N valley and central valley both required such a "yardstick". The secondary datum for the central valley is the tram turnaround just *mauka* of the present restaurant. Sites are also located in the text of this report in terms of present valley landmarks--the three bridges and three meadows in the S valley, the tram road that bisects the S valley, and the tram turnarounds near

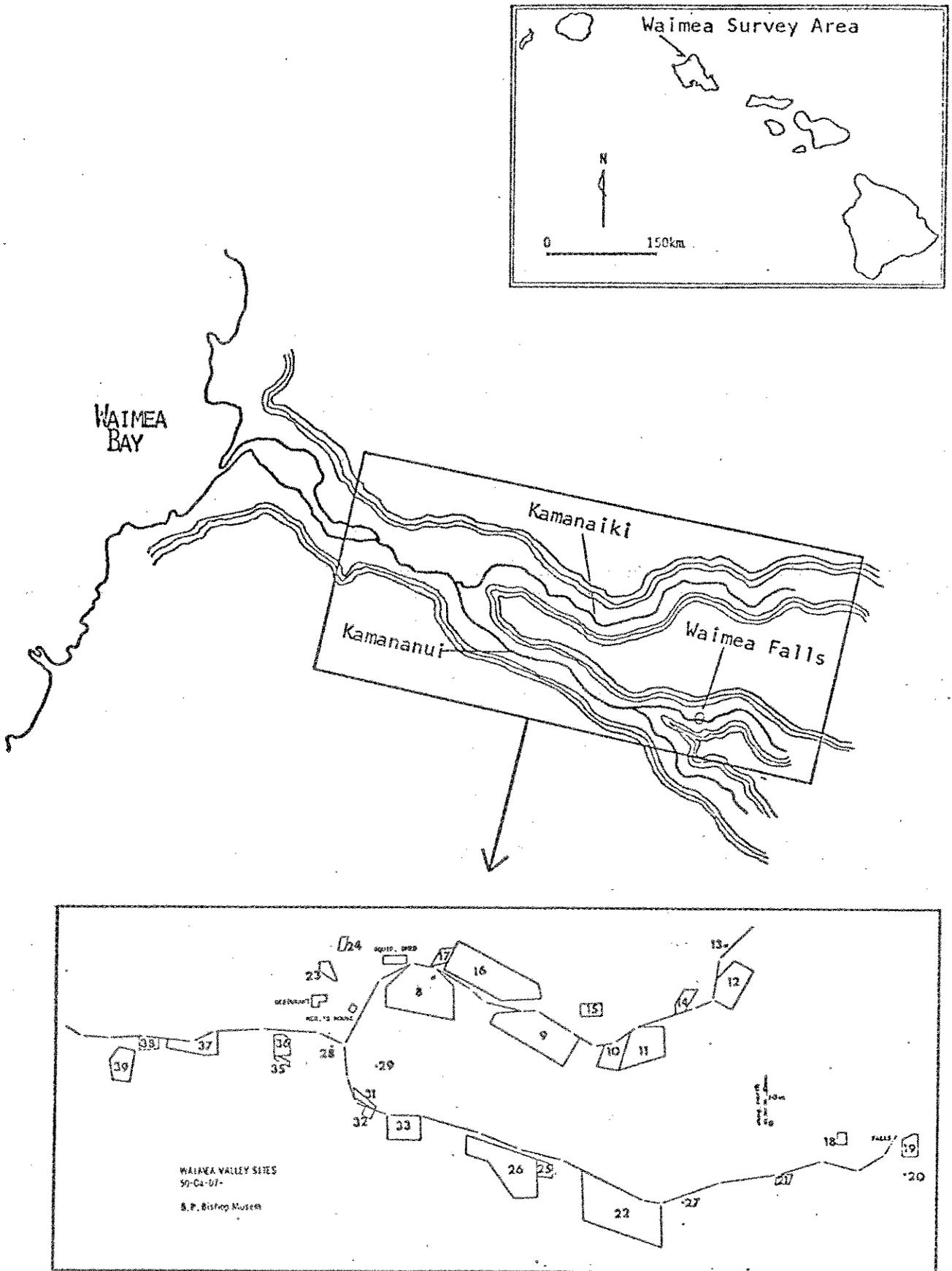


Fig. 1. LOCATION MAP FOR PROJECT AREA.

Waimea Falls and near the restaurant. Each site was mapped in plan by Brunton compass and tape, and photographic records were kept on 35-mm roll film.

TERMINOLOGY

All bearings and directions are given in terms of magnetic North, which is 11.5° E of true North in Hawaii. Occasionally, the Hawaiian directional terms are used--*mauka* (inland, upland toward the mountain), and *makai* (on the seaside, in the direction of the sea).

The term "talus" refers to rock that has fallen from the valley sides. "Taluviium" refers to a mixture of soil and talus rock; "alluvium" refers to purely soil structures, which are usually water-lain deposits.

SITE DESCRIPTIONS

D7-7 ROCK-SHELTER BURIALS

This site is located c. 10 meters above the present Waimea Falls Park access road on the N side of the central valley, c. 50 meters *mauka* of the park's chainlink gate. The shelter is 5 meters long, 0.6 meter high and 1.2 meters deep. The burials within lie in 5 to 10 cm. of powdery dust and leaves and appear disturbed. Skeletal material remaining indicates at least two individuals were buried here; a 0.5-meter-long section of old, curved planking suggests that this may have been a canoe burial. The shelter is quite dry and the bones are in good condition.

D7-8 HISTORIC ENCLOSURE

This is a large (110 meters long, 35 meters wide), walled enclosure at the foot of the central dividing ridge in the valley (Fig. 2). The interior of the enclosure has been bulldozed and subsequently used as a picnic area, as evidence by stone and concrete barbeque pits and horseshoe-toss pins. A portion of the W enclosure wall (feature A) is present on a 1920 map of the valley, indicating that the wall was built prior to this date.

Feature A is a heavy, crudely built, single-stacked boulder wall, c. 1 meter high and 0.8 meters wide, forming the W side of the enclosure. The wall extends 35 meters NE from the foot of the talus, becoming progressively more broken down until it is cut off by Kamaikai Stream.

Feature B is a single-stacked wall, c. 1 meter high and 25 meters long, running E from the NW side of the enclosure. The W end of the wall appears to have been disrupted by bulldozing for the last 5 meters of its length. The E end of the wall forms a small, 3- by 5-meter, semi-circular enclosure ending in a cluster of boulders.

Feature C is a crude, semi-circular enclosure, 2 by 2 meters, with a 1-meter-high, multiple-stacked wall. A large boulder forming the S boundary has a series of natural depressions that act as water catchments in its W face.

Feature D is a crude, single-stacked wall curving SE for c. 85 meters along the base of the talus slope. The wall is 0.7 to 1.3 meters high and 0.8 meters wide; much of the wall is built upon large, *in situ* boulders lying at the base of the talus. The wall is broken down all along its length, probably as a function of its generally fragile construction more than any other single cause.

Feature E is a series of crude single-stack-boulder alignments, 0.7 to 1.5 meters high and wide, running S up the talus fan for a distance of c. 35 meters. These walls probably functioned as retaining and boundary features at this site.

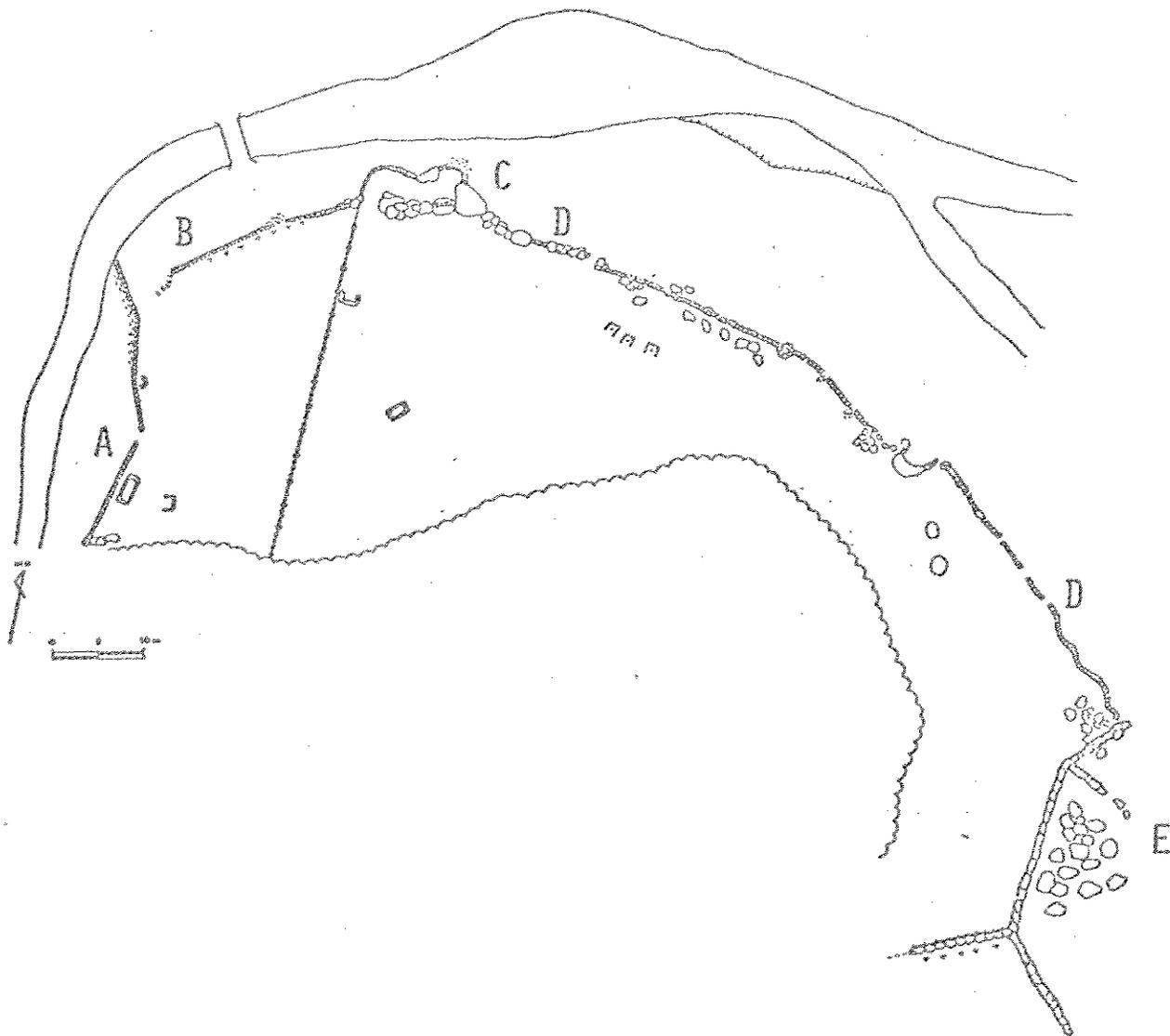


Fig. 2. PLAN OF SITE D7-8, HISTORIC ENCLOSURE.

D7-9 WALL AND TERRACE COMPLEX

This site, on the S side of the N valley, is probably an agricultural system which combines dry agriculture features on the talus slopes with a terrace remnant on the valley floor. Test excavations should be conducted to ascertain the function of this area. Feature E (described below) is of particular interest because it may be one of few wet terraces in the N valley. The lack of historic debris may be an indication that this area was not extensively damaged by historic occupation.

Feature A is a crude, multiple-stacked wall--4.5 meters long, 1.1 meters high and 0.8 meter wide--located on the talus slope.

Feature B, located downslope from feature A, is a more defined, single-stacked wall segment. The wall is 6 meters long, and 0.45 meter wide; the height on the downslope is 1.3 meters, and on the upslope, 0.75 meter.

Feature C, a crude, single-stacked wall of large boulders, is located SE of features A and B on the talus slope. It runs upslope, trending N-S, for c. 35 meters, and measures c. 0.8 meter wide and 0.25 to 1.0 meter high. Three crude facings radiate from it--3 to 5 meters long, 0.4 to 1.0 meter wide, and 1.0 to 1.4 meters high on the downslope face, and 0.4 meter high on the upslope face. Talus build-up obscures the extent of this feature.

Feature D--4 meters long, 0.5 meter high, and 0.7 meter wide--is a facing that begins NE of feature C and extends E from the base of the talus.

Feature E (Fig. 3) is a 33-meter-long facing that runs 14 meters SW of the slope and defines an open terrace parallel to it. Feature D, to the SW, and feature F, to the SE, are both located at the base of the slope. The facing is of single-to-multiple-stacked construction and measures 0.5 to 1.0 meter high and 0.3 to 0.7 meter wide. This feature becomes very crude at the NW end. Feature E may have bounded a living area or possibly was part of a terrace system.

Feature F, situated SE of feature E at the base of the slope, is a very crude, rubble-filled enclosure. It has a semi-circular shape with the 9-meter diameter against the slope and extends c. 4 meters to the NE. This feature has two walls partially extending from either end off the slope. The E extension is 1.5 meters long, 0.4 meter wide, and 0.7 meter high, while the W extension is 4.5 meters long, 0.6 meter wide, and 0.7 to 1.0 meter high. Both wall segments are multiple-stacked and in poor condition. This feature appears to be a modified natural feature.

Feature G, similar to feature F, is a crude platform which appears to be slightly modified talus debris that extends 2 to 3 meters from the base of the slope. It is located c. 15 meters SE of feature F and extends SE for c. 15 meters. The platform has been faced using single-to-multiple-stacked walls that are 0.8 to 1.0 meter high.

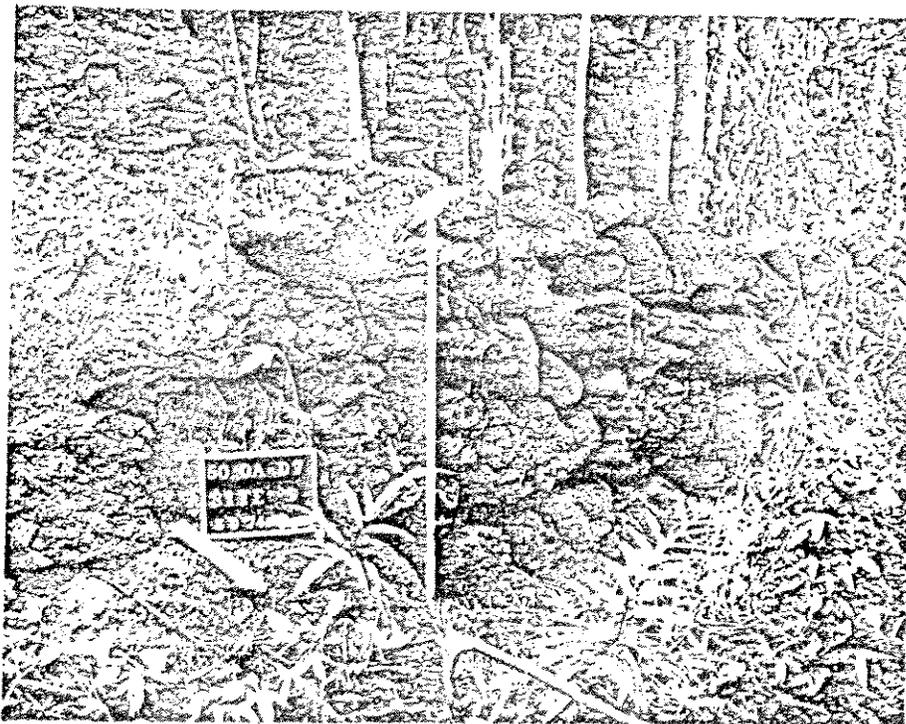


Fig. 3. TERRACE WALL, FEATURE E, SITE D7-9
(facing SW).

D-7-10 WALLED ENCLOSURE

This site, consisting of a walled enclosure, low rubble alignments and streambed paving (Fig. 4), is located adjacent to M 530 on the S side of the N valley.

Feature A, an enclosure, uses the S cliff face as the S boundary. On the E, a stone facing measuring 1.4 meters high and 0.5 meter wide extends outward for 9.5 meters and becomes a standing wall (c. 35 meters long) which curves N and rejoins the cliff. Constructed of large-to-medium boulders, this wall is single-to-multiple-stacked, and measures 0.8 to 1.2 meters high on the interior side, 1.3 to 1.6 meters high on the exterior, and 0.5 to 1.0 meter in width. These high, rather poorly constructed walls may indicate an animal enclosure of recent construction--perhaps built during the early 1900s. Test excavations may be useful in substantiating this claim, as well as determining if the present structure was built over an earlier foundation (feature B).

Feature B is a low, medium-boulder alignment which intersects the N wall of feature A at a point c. 7 meters from the E face. Feature A appears to be constructed over this alignment. Feature B extends c. 4 meters in an E-W direction on either side of the feature A; therefore, excavation at the intersection would be useful in determining the relationship of these features.

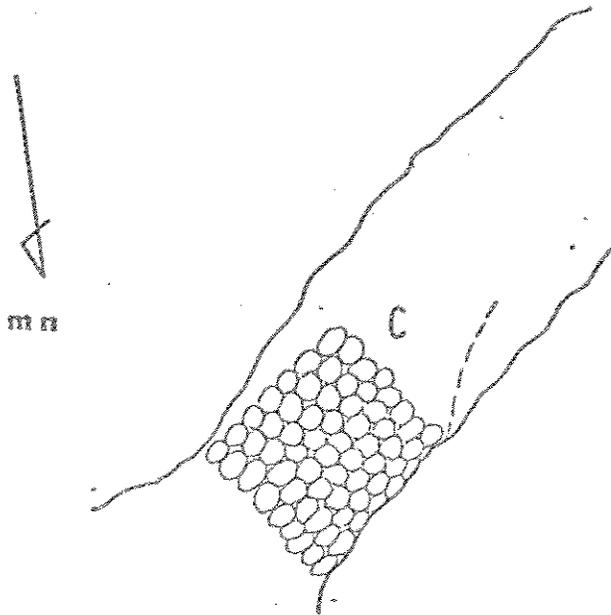
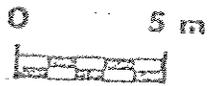
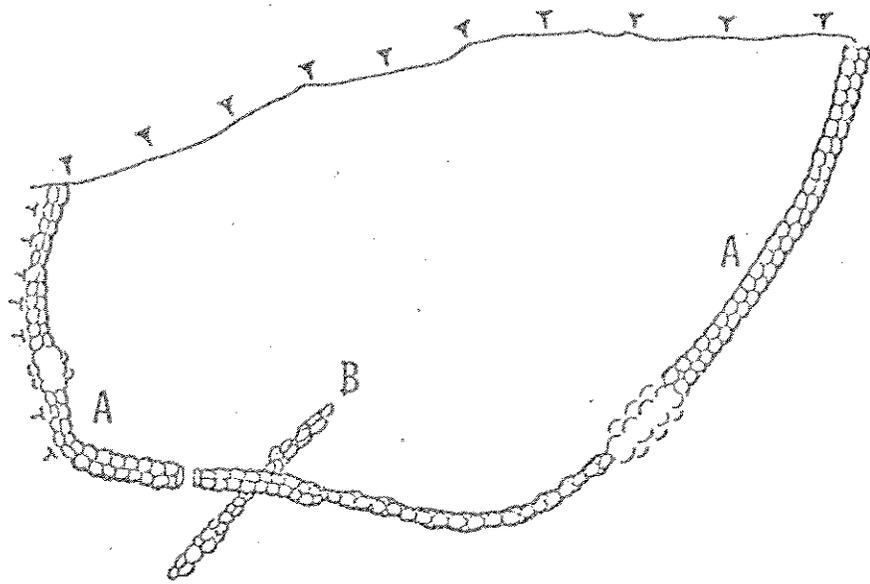


Fig. 4. PLAN OF SITE D7-10, WALLED ENCLOSURE.

Feature C, a large-boulder paving measuring 6 by 6 meters, is located in Kamaikai streambed. It probably functioned as a road's stream crossing. This stone work is partially overlain by the bulldozed road edge, indicating that the road antedates the boulder paving.

D7-11 WALLS AND HISTORIC REMAINS

This site (Fig. 5) appears to have been used extensively during the 1900s. Many historic artifacts--including bottles and even sewing machines--were scattered throughout this area on the S side of the N valley between sites D7-10 and D7-12

The few surface remains include a cement slab--c. 3 by 1.5 meters--with a stone-faced pit (this structure appears to be the base for a *furo*--a Japanese bath house (Fig. 6); a 60-meter-long wall-facing that extends intermittently along the base of the talus; and a c. 25-meter-long single-stacked boulder wall, the *mauka* boundary (oriented N-S) for a land shelf at the *mauka* extent of the site.

The few surface remains represent a historic usage and do not demand further investigation.

D7-12 WALLS AND HISTORIC REMAINS

This site (Fig. 7) is part of the locus for much of the late historic (1900s) settlement in the S side of the N valley. Historic artifacts (glass bottles, metal objects, pieces of ceramic crock and glass, a bathtub, and metal pipes) litter the area. The site extends from the base of the cliff to Kamaikai streambed on the N and W and to site D7-13 on the E.

Feature A, a multiple-stacked facing, extends c. 50 meters from the cliff to feature B, a platform. The facing is c. 1.0 to 1.3 meters high on the W face, up to 7.7 meters high on the E face, and 0.5 to 0.9 meter wide, and is oriented NE; it is generally 7 to 10 meters E of Kamaikai streambed. This feature probably functioned as a barrier against flooding.

Feature B, a platform, is located at the NW corner of site D7-12 and constructed on the E streambed face. The platform measures 12.5 meters long, 3.0 meters wide, 1.5 meters high on the W face, 0.8 to 1.5 meters high on the N face, and 0.8 to 1.1 meters high on the S face. It is open on the E face. The facings are primarily single-stacked and at the point where feature A intersects the S face--3.5 meters from the *makai* face--the facing becomes a multiple-stacked wall that is 8 meters long, 0.5 to 0.6 meter wide, and 0.7 to 1.0 meter high.

Feature C, located c. 8 meters NE of feature B, extends for 7.5 meters as a multiple-stacked wall measuring 1.0 meter wide and 1.1 meters high on the N face, and 0.6 meter high on the S face. The wall has a cement trough--1.6 by 0.8 meter by 0.45 meter deep--built into the E end. This feature continues in a NE direction for c. 10 meters as a single-stacked facing--0.3 to 0.7 meter high and 0.3 to 0.4 meter wide.

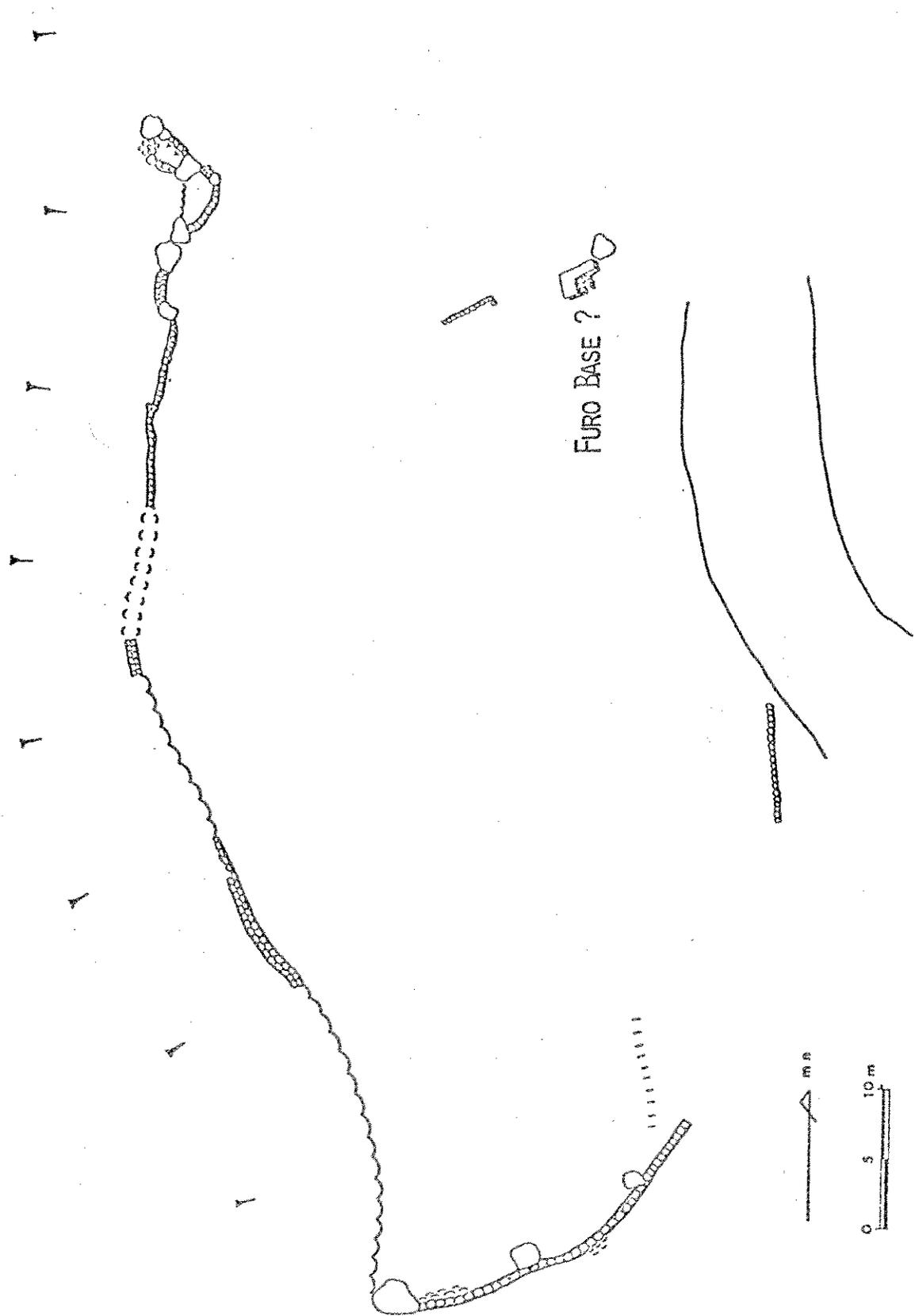


FIG. 5. PLAN OF SITE D7-11, WALLS AND HISTORIC REMAINS.

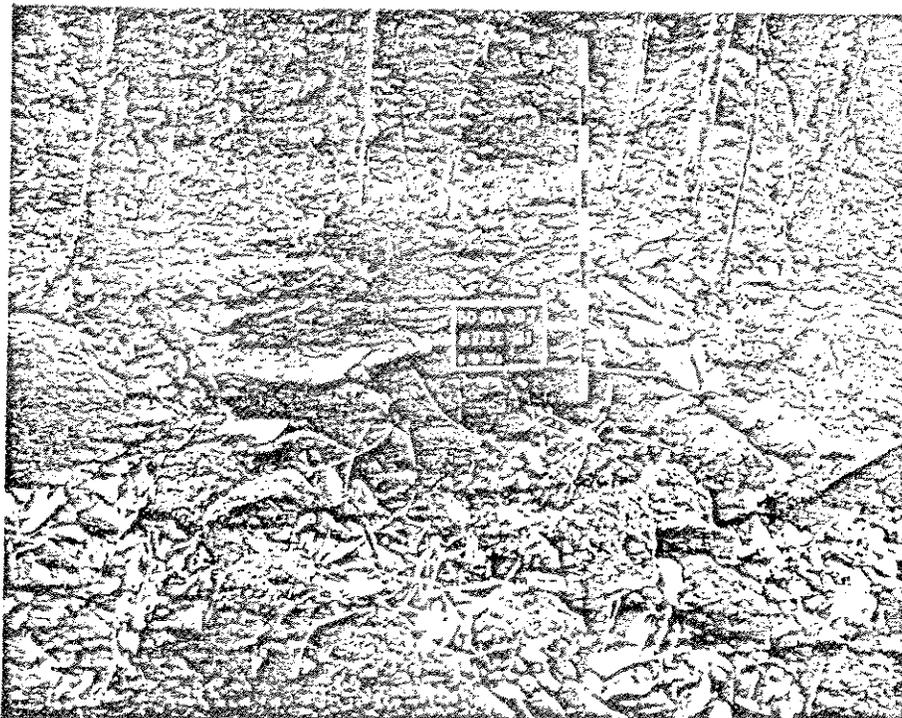


Fig. 6. POSSIBLE BASE FOR FURO, SITE D7-11
(facing S).

Feature D consists of a shallow, circular, cement depression--c. 2.5 meters in diameter and 0.1 meter deep, located c. 1 meter E of feature C, and a single-stacked facing--0.5 to 1.0 meter high, 0.4 meter wide, and c. 5 meters long--that curves around the eastern perimeter of the cement at a distance of 1 meter from its edge. The facing continues S for c. 5 meters more in an increasingly deteriorated condition. The depression is possibly the base for a water tank.

Features E and F are low, semi-circular, cement embankments--a maximum of 1 meter in diameter, 0.1 meter high, and 0.1 meter wide--that are located at the base of the cliff at the SE corner of this site. They are constructed c. 10 meters apart around natural springs. The name "Punakai" is given to the spring [Handy, 1940:87]. These features are evidence of the extensive use of this area during historic times.

D7-13 JAPANESE SHRINE

Located in the N valley at the *mauka* portion of the survey area, where the road to the central ridge begins, is what appears to be a shrine (Fig. 8). Two explanations are offered by informants for the construction of this feature. One possibility is that it is a Shinto shrine built by the Japanese pineapple workers; the other story is that a Japanese couple constructed this in memory of their seven-year-old daughter who drowned in a flood. Both accounts may represent the same act.

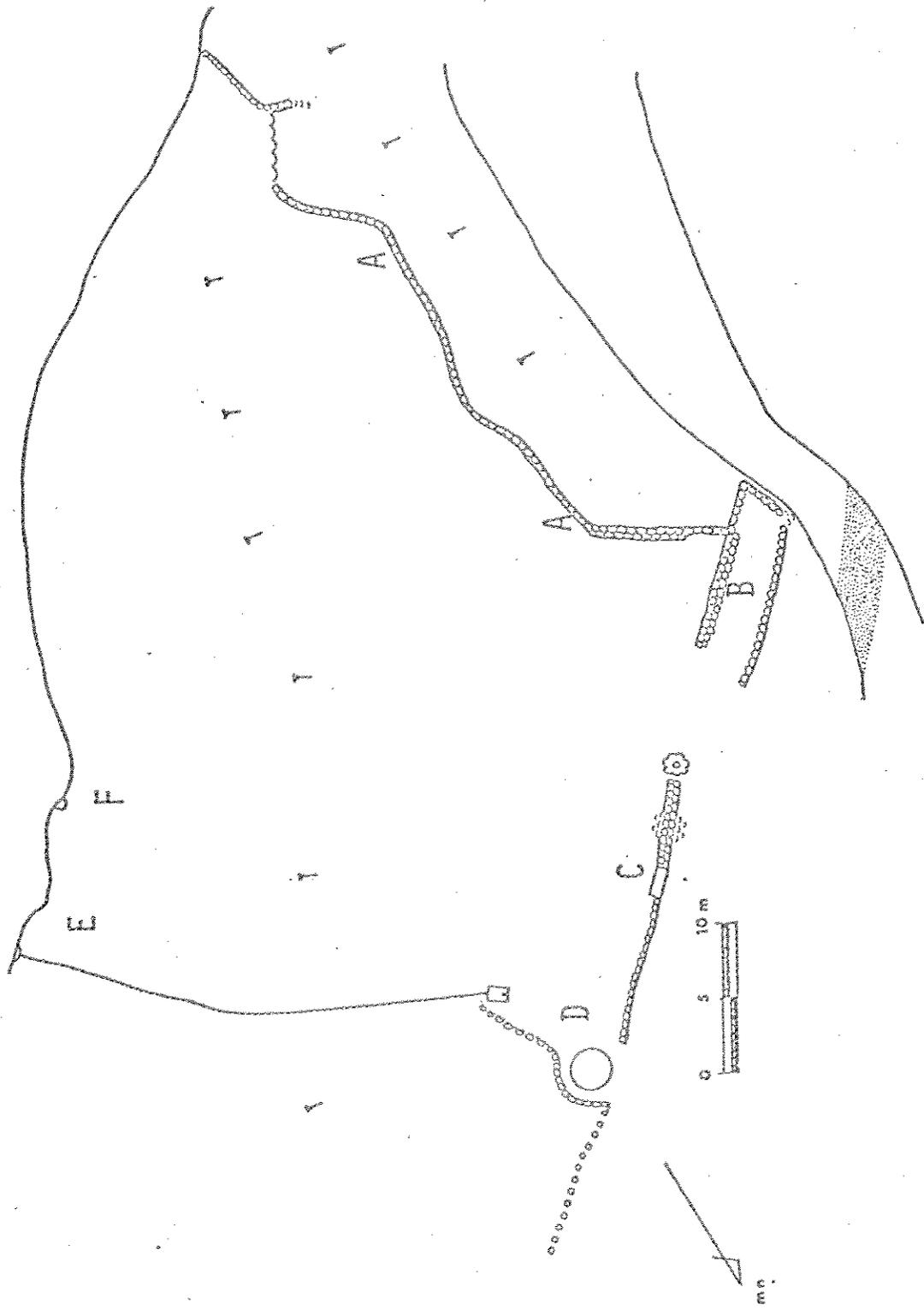


Fig. 7. PLAN OF D7-12, WALLS AND HISTORIC REMAINS.

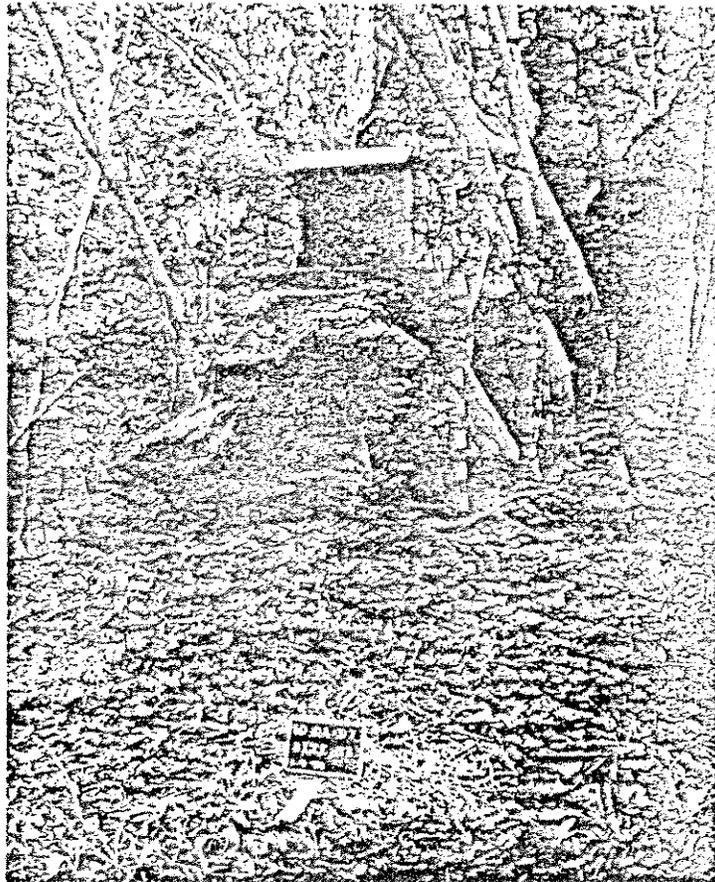


Fig. 8. JAPANESE SHRINE, SITE D7-13
(facing N).

The shrine is constructed on boulders. The boulder base measures c. 4.5 by 3 meters; it is 3.8 meters high on the N, and a maximum of 1.6 meters high on the S, and is situated on the S bank of Kamaiki Stream. The structure, centered on the boulder base, has a platform measuring 1.1 by 1.5 meters and is c. 1.2 meters high. A cement platform--1.1 by 1.5 meters and 0.2 meter high--is the base on which a three-sided, roofed, cement structure was constructed. The shrine opens almost due S. A platform--0.5 by 0.3 meter and 0.1 meter high--located within this shelter probably functioned as the altar.

This feature is in close geographical proximity to other features (D7-12) associated with the Japanese occupation of this section of the valley. A great quantity of historic midden is scattered throughout this area. This includes pieces of rice bowls, tea cups, Dai Nippon bottles, metal pots, and a range of historic living material. Artifacts that aided the interpretation of the cultural usage of this area and/or that could be part of a display on Waimea Valley for the Bishop Corporation were collected (see list of artifacts).

D7-14 DRY-AGRICULTURE MOUNDS

Situated just above the present roadcut on the N side of the N valley, this site appears to be a line of dry-agriculture mounds stretching *mauka* and slightly upslope for c. 60 meters from M 620.

The mounds may have been used for growing sweet potatoes. The site is comprised of five features, all of which have large, naturally occurring boulders as their foundations, and are flush with the ground surface on the upslope side.

Feature A is a 2.5- by 5-meter mound of small boulders which fill crevices formed by large, *in situ* boulders. The mound's maximum height is 1.6 meters on the downslope side.

Feature B is a 1.5- by 2.5-meter mound, 1 meter high, which is formed by small boulders piled behind a large (1.5-meter diameter), naturally occurring boulder.

Feature C is a 1.5- by 3-meter mound, 0.9 meter high. Framed by three large *in situ* boulders, the mound is formed by small boulders stacked in the interstices. The S (downslope) side of the mound is well faced.

Feature D is a low (c. 0.5-meter high), irregular mound, 3 by 3 meters, formed by small boulders that lie between two large boulders that are on the N and S sides of the mound.

Feature F is the uppermost of the five mounds, lying well up on the taluvial slope. It is c. 3 by 5 meters and 0.8 meter high. Like the others, this mound is comprised of small boulders which lie behind and among large, naturally occurring boulders.

D7-15 DRY-AGRICULTURE MOUND

This site consists of a 5- by 12-meter rectangular patch of small boulders facing a steep (40°) alluvial slope on the N side of the N valley. The boulders lie stacked, one-to-three stones high, over the ground surface. A zigzag foot trail (originating at M 400) passes immediately E of the mound and continues on to the top of the slope. This trail may have been a route of access to and from the valley. Having a relatively easy access, and being optimally situated to receive maximum sunlight, this site probably was a sweet-potato patch.

D7-16 DRY-AGRICULTURE COMPLEX

Stretching c. 205-meters from M 65, along the N taluvial slope of the N valley, site D7-16 appears to be a large, dry-agricultural complex (Fig. 9). It averages 50 meters in width and is composed of a series of semicircular enclosure walls, agricultural mounds, and a possible house site, that are in fair-to-good condition. These features indicate intensive use of this area for the growing of dry-land crops such as sweet potato and dry taro, bananas, and sugarcane.

Beginning on the *makai* end of the complex, feature A is a stepped set of three pie-shaped terraces with single-stacked boulder faces, c. 0.5 meter high. The lowest terrace is 10 meters long and is broken down on the E. The middle terrace has a curved face, c. 20 meters long, and is broken out or alluviated on the W. These appear to be dry-agricultural features.

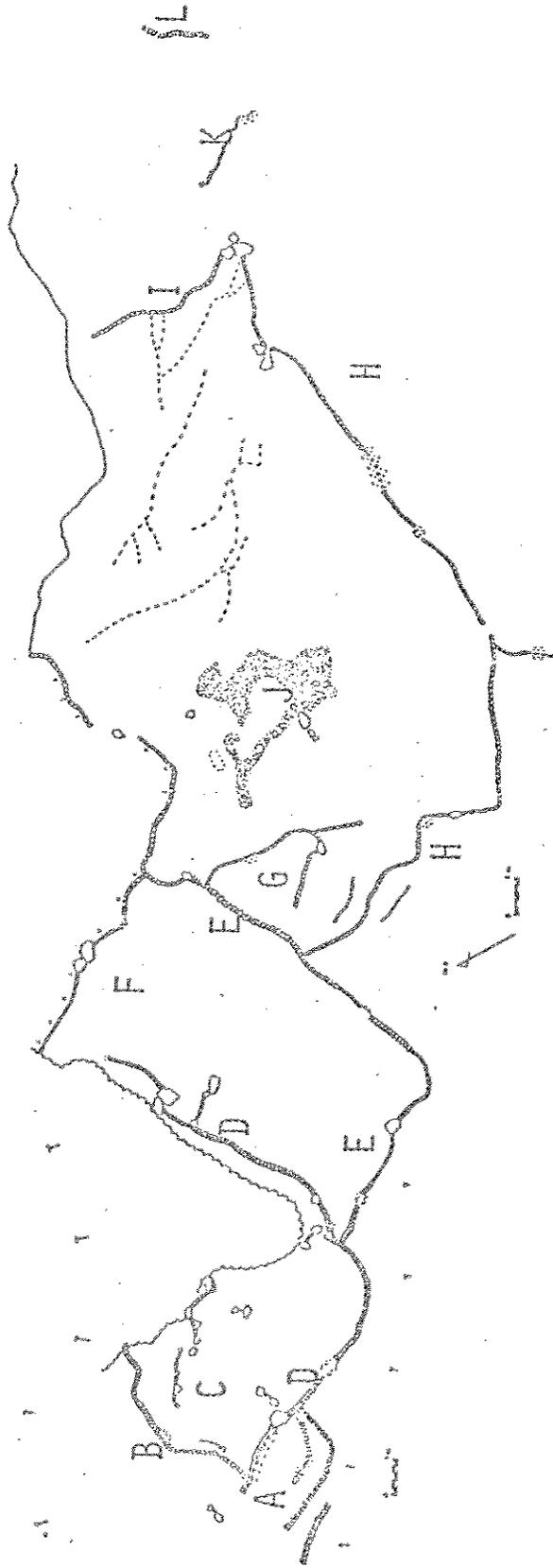


Fig. 9. PLAN OF D7-16, DRY-AGRICULTURE COMPLEX.

Feature B is a single-stacked boulder wall that trends 25 meters NE from the *makai* end of the main enclosure. This wall is from 1 to 1.5 meters high and from 0.5 to 1 meter wide, and forms a narrow, 2-meter-wide terrace at the back (N) of the enclosure.

Feature C is a crude facing of single boulders, 7 meters long and 6.8 meters high on the downslope side.

Feature D is a long, semicircular, enclosure wall (Fig. 10) that forms the first (*makai*) of three interrelated enclosures. It is c. 80 meters long, and is constructed of multiple-stacked boulders; the lower (S) portion of the wall has been alluviated and forms a terrace, 1.1 meters high on the downslope side. Freestanding portions of the wall range from 0.5 to 0.8 meter in height, and from 0.4 to 0.8 meter in width. The northern 10 meters of the wall is of single-stacked construction, 0.5 meter wide and 0.9 meter high. The interior of enclosure D is moderately clear, and has a scattering of small, crudely faced terraces.

Feature E is a single-to-multiple-stacked wall, forming the middle enclosure. Abutted to wall D on the W, feature E begins a multiple-stacked-boulder terrace facing, 0.9 meter wide and 1.1 meters high on the downslope side. This facing continues for 22 meters, trending SE, then makes a right-angle turn upslope and continued NE for meters. In this section the facing gradually becomes a single-stacked-boulder facing 0.5 meter wide and 1 meter high. Near the top of the taluvial slope, the wall again turns SE for 15 meters and becomes a single-stacked-boulder facing, 0.5 meter wide and 1 meter high on the downslope side. The facing then swings NE and continues for 40 meters to the base of the cliff.

Feature F is a single-stacked, boulder-faced, dirt terrace, 25 meters long, c. 1 meter high and 0.8 meter wide, that abuts wall E at the top of the taluvial slope and runs NW along a talus fall. The central enclosure formed by the above features is an open, dirt-filled area suitable for a wide variety of dry-land crops.

Feature G is a crude, single-stacked wall, running S down the taluvial slope from wall E for a distance of 17 meters. The wall is c. 0.5 meter wide and from 0.6 to 1 meter high. This terrace continues, in poor condition, due W for an additional 8 meters. A 5-meter-long, single-stacked boulder spur extends S from the curved portion of the wall.

Downslope of feature G lie three small, crudely constructed terraces, c. 5 meters long and 0.5 meter high. The center terrace extends SE for 5 meters, and becomes a wall, feature H. This is a 90-meter-long, single-to-multiple-stacked wall, forming the third (*mauka*) enclosure. The wall is broken down in several places, but averages 0.5 meter wide and 1 meter in height on the downslope side, and 0.4 meter high on the upslope side; the average width is 0.5 meter. This wall is much more fragile in construction than the other two enclosures and appears to be a later addition to the complex.



Fig. 10. ENCLOSURE WALL, FEATURE D, SITE D7-16
(facing W).

Feature I is a 20-meter-long, N extension of wall H. It is a crude, single-stacked-boulder wall, 1.2 meters high and c. 0.5 meter wide, lying in jumbled, boulder talus. This wall also appears to be more recent than other, *maka*i portions of the site.

Feature J is a boulder-faced knoll (10 by 15 meters) lying in the upper center of feature H. The top of the knoll is dirt-filled and forms a 6- by 7-meter platform which could have been a house site. The boulder facing on the E side of the knoll forms a mound 0.8 meter high and 4 meters wide; this mound could have been either an agricultural feature or the remnant of an old wall. The boulder facing on the rest of the knoll appears to be a sweet-potato growing area. Test excavation in the dirt platform could determine its function.

Feature K is a boulder-faced terrace lying in a shallow gulley on the E (*mauka*) side of the site, outside the *mauka* enclosure. The facing is 0.5 meter high and 10 meters long.

Feature L is a 10-meter-long, multiple-stacked-boulder facing, 0.7 meter wide and 0.6 meter high on the W. These last two features are included as part of D7-16 because they appear to be related to the rough talus wall of the *mauka* enclosure.

D7-17 WALL AND DRY-AGRICULTURE SLOPE WITH TERRACES

Site D7-17 is situated on the N side of the N valley, in a broad, shallow gully 15 meters *makai* of the large agricultural site D7-16. Comprised of six features including a possible *kuleana* wall, a sweet-potato growing slope (similar to site D7-15), and associated dry terraces (Fig. 11), site 17 may have been part of site 16. However, no stone alignments connect the two sites today; a dry wash between the two areas indicates the possibility that connecting walls were washed away.

Feature A is a possible *kuleana* wall crudely built of stacked-boulder talus. The wall lies on the taluvial slope, from just above the bulldozed road at M 40 to an ochre rock outcrop at the base of the N cliff, a distance of c. 50 meters. The wall appears to be rebuilt along the upper 8 meters of its length. Its downslope height is 0.7 to 1.3 meters; it is up to 0.7 meter high on the upslope side, and is 0.8 meter wide. Boulder outcrops occur in several places along the wall, and two such outcrops (at 8 meters and again at 10 meters from the lower end of the wall), form natural shelters in the wall's W face. Neither dirt-floored shelter had any cultural remains within.

Feature B consists of a 3- by 5-meter, cobble facing on a steep (40°) portion of the taluvial slope, similar to the boulder-faced slope of site D7-15. Accordingly, feature B is identified as a probable sweet-potato patch.

Feature C is a possible terrace in poor condition. It is 2.5 meters long, 0.3 meter high, and 0.5 meter wide, and is faced by a line of small boulders lying directly above feature B.

Feature D is a possible dry-agriculture boulder-faced dirt terrace, 0.6 meter high, 7 meters long, and 0.7 meter wide. The W extent of the terrace becomes unclear beyond this point.

Feature E is another possible dry terrace similar to feature D; it is 0.8 meter high and wide, and 18 meters long, and terminates at a rock outcrop in wall feature A. The W 5-meter portion of the terrace contiguous with the wall (feature A) is badly eroded by sheet wash, but is still sufficiently intact to allow association with the wall.

Feature F is a boulder facing of a natural outcrop on the E side of the site. It is 2.6 meters long and 1.1 meters high and wide, and appears to have been an erosion-control device to protect terrace feature E.

D7-18 TERRACED SLOPE

This site consists of two possible dry-agriculture terraces situated above Waimea Falls on the nose of a ridge on the N side of the S valley. Located c. 60 meters above the planted area at the tram-turnaround below the falls, the terraces lie one above the other on a steep slope that varies in angle from 30° to 50°. Both terraces are boulder-faced, dirt-filled features with small, natural cupboards at the rear of each terrace. No cultural material was found on the surface at this site.

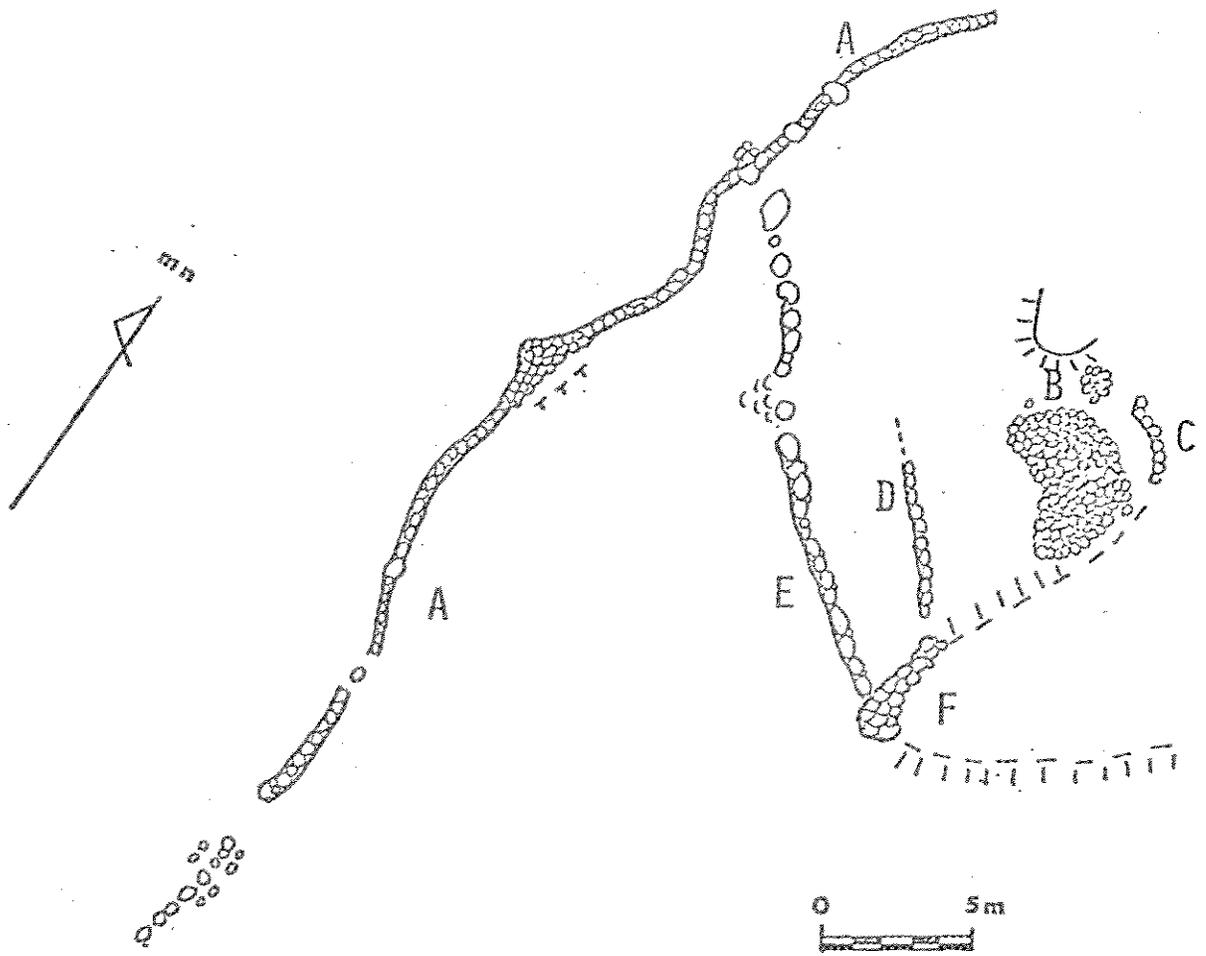


Fig. 11. DRY-AGRICULTURE SLOPE WITH TERRACING, SITE D7-17.

Feature A is a small (c. 5 meters long, 0.5 meter high and 1 meter wide), terrace in fair to poor condition. It has a line of naturally outcropping boulders forming a boundary on the E, while a broken-down stacked wall, 3 meters long, 0.5 meter high, and 1 meter wide, limits the W extent of the terrace.

Feature B is the larger of the two terraces--c. 9 meters long, 0.9 meter high, and 1 meter wide. This terrace lies c. 7 meters below terrace A, and appears to have been alluviated by clay soils from upslope areas.

D7-19 DRY-AGRICULTURE TERRACES

Located *mauka* of Waihee Falls on the nose of a taluvial fan on the S side of the S valley leg, site D7-19 (Fig. 12) appears to be a dry-agricultural complex comprised of four features, described below.

Features A, B, and C are apparent dry-agriculture terraces with stacked-cobble facing on the downslope sides. The side boundaries of the terraces are more poorly defined, and are usually only one-stone-high alignments in generally poor condition. All terraces appear to be elaborations on natural contours. Terrace feature A is the largest of the three, c. 13 meters long, 0.7 meter high, and 0.5 meter wide. The front facing is in fair condition. Terrace feature B is the smallest, c. 4 meters long and 0.6 meter high, and 0.5 meter wide. The facing of this terrace is in good condition. Terrace feature C is the most heavily constructed, and is c. 6.5 meters long, 0.7 meter high, and 0.5 meter wide. The rear portions of this terrace have been covered by a bulldozed road running above the site.

Feature D is a single-stacked wall fragment, 2.7 meters long, 0.4 meter high, and 0.5 meter wide. Lying perpendicular to Kamananui Stream, the function of this wall remnant is unknown.

Excavations in the terraces could test the dry-agriculture function advanced for these features.

D7-20 DRY-AGRICULTURE MOUND

This feature, a low, stone mound located above site D7-19 on the nose of the same taluvial fan, is something of an enigma; it does not fall readily into any convenient category of Hawaiian structure. The mound lies on a small flat on a 20° slope, and measures about 3 meters on a side. The mound's center is slightly depressed, and may indicate some kind of special function; it seems most likely that it was used for agriculture. It may have served as a burial; a remote possibility is that it is a small shrine, the depression being the offertory.

Other mounds with similar indentations also occur at sites D7-22 and -26; excavations at these mounds would help in determining their function and allow an intersite comparison.

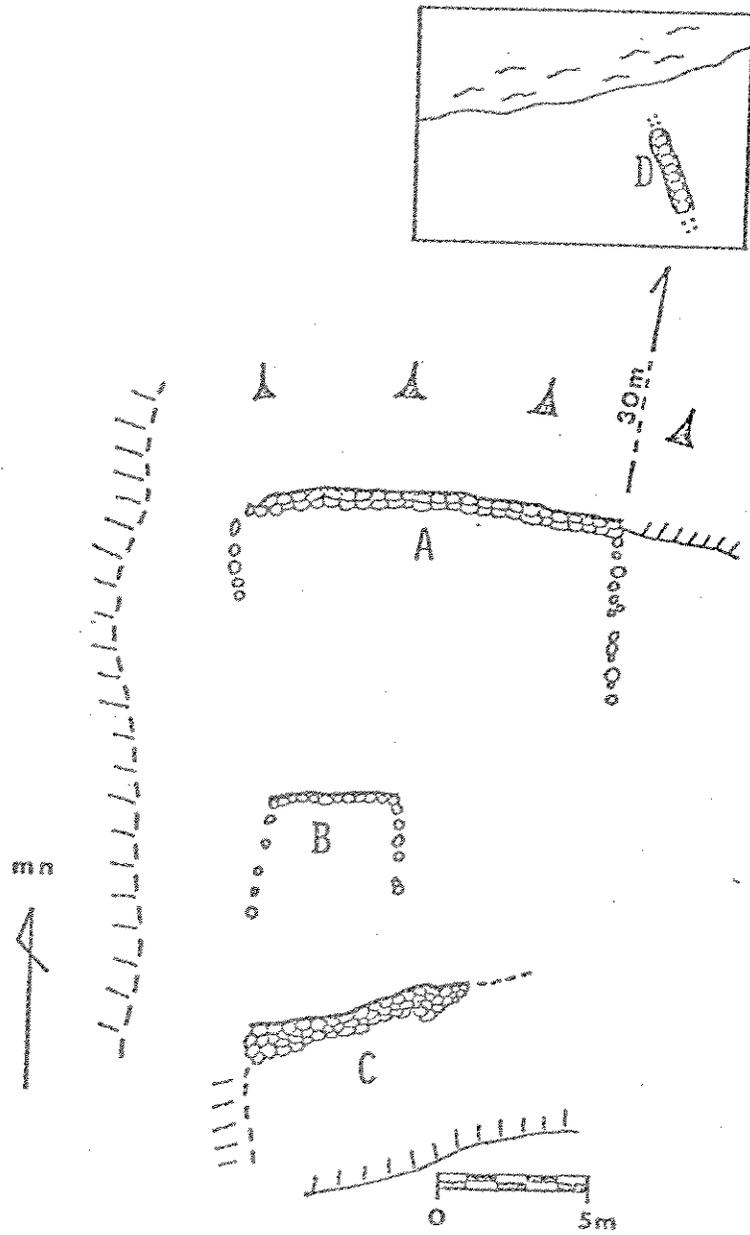


Fig. 12. PLAN OF SITE D7-19, DRY AGRICULTURAL TERRACES.

D7-21 WALLS AND TERRACES

This site consists of two facing and two walls located on the S side of the S valley, just *maka'i* of the third bridge. These features, in poor condition, are crudely constructed and may be remnants of a flood-damaged agricultural system.

Feature A is a multiple-stacked wall of small boulders. It measures 4.7 meters long, 0.5 to 0.75 meters wide, and has a maximum height of 1.2 meters on each side.

Feature B, a 12.5-meter, partially collapsed, multiple-stacked wall, is oriented upslope with what appear to be three short (2 meters) facings radiating *mauka*. Stones ranging from cobbles to large boulders were used in construction. The wall has maximum heights of 1.8 meters on the *mauka* face, and 0.7 meter on the *maka'i* face; it is 1.0 meter wide.

Feature C is a large, boulder alignment oriented *mauka-maka'i*. It measures 17 meters long, 0.5 to 1.0 meter wide, and has maximum heights of 2.2 meters at the *mauka* end and 0.5 meter at the *maka'i* end.

Feature D, a single-stacked, medium-boulder alignment, measures 6 meters in length, 1.1 meter high, and 0.5 to 0.8 meter wide. This feature is oriented upslope and appears natural with only slight modification.

D7-22 WALL AND TERRACE COMPLEX

This site consists of several walls and terraces that delineate the area of the third meadow on the S side of the S valley (Fig. 13). These features may be remnants of a large agricultural complex described by Handy: "The largest *lo'i* area, however, was below the falls by a grove of monkeypod trees. Known as Ka'ilili, the area was situated on land elevated above the streambed and irrigated by means of an *'auwai* still to be seen along the base of the pali" [Handy & Handy, 1972: 464]. The *'auwai* has since been destroyed, probably by the construction of a bulldozed road on the S talus slope. However, a substantial number of surface remains are in fair-to-good condition and warrant further attention. An eventual possibility is the reconstruction and restoration of part of this area as an example of a wet-terrace system.

Feature A is a terrace formed by three wall segments constructed in a C-shaped arrangement against the base of the talus at the *mauka* end of this site. On the E, a multiple-stacked, boulder alignment (0.2 meter high and 0.4 meter wide) extends 3 meters N at which point it curves W and becomes a retaining wall (11 meters long, 0.6 meter high, and 0.6 meter wide). A 6-meter-long, multiple-stacked wall (1.4 meters high on the W face, 0.8 meter on the E face, and 1.0 meter wide) is the final segment and extends to the talus.

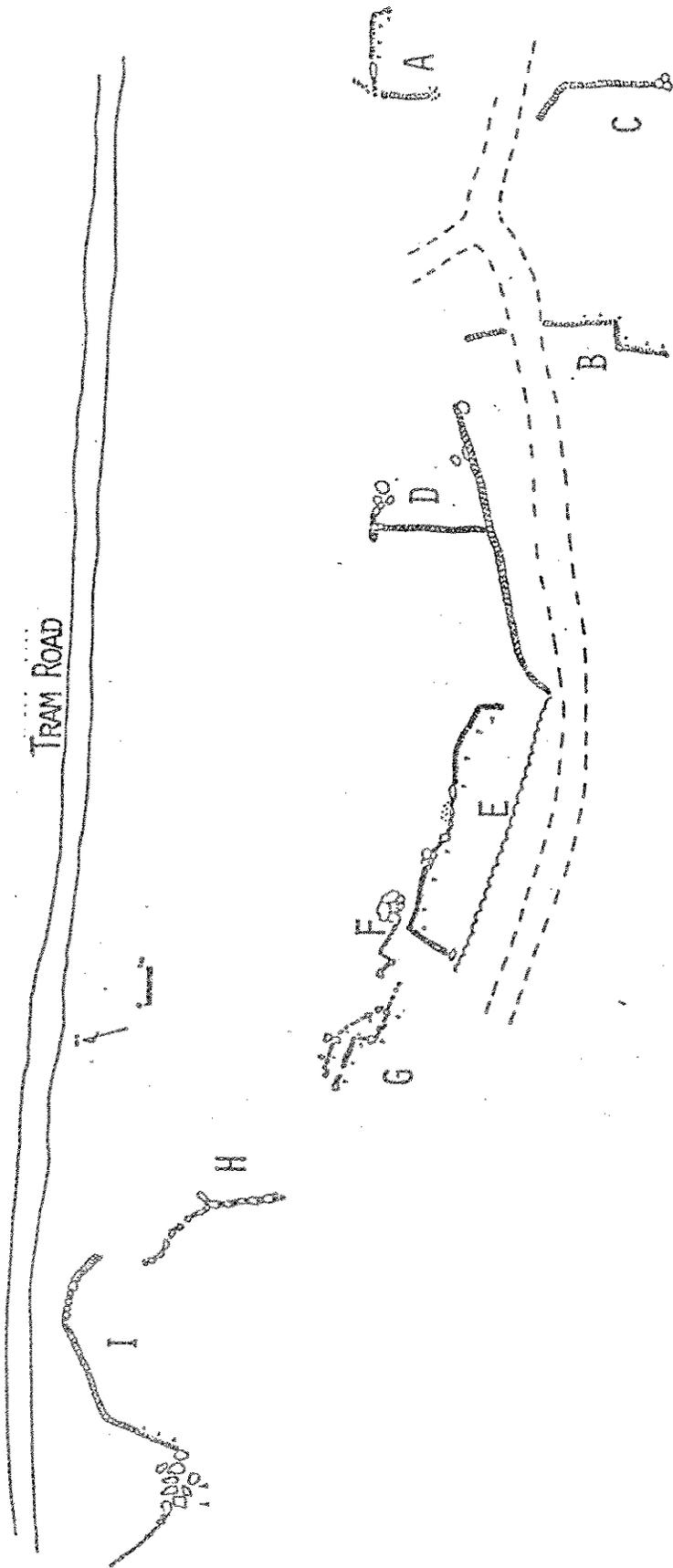


FIG. 13. PLAN OF SITE D7-22, WALLS AND TERRACES.

Feature B, located 30 meters *makai* of feature A, is a multiple-stacked wall (0.6 to 1.6 meters high on the W face, 0.1 to 0.9 meter high on the E face, and 1 meter wide), oriented upslope. A bulldozed road intersects this feature; 6 meters of the wall is located down-slope of the road and the other section continues upslope for 6 meters as a multiple-stacked wall and changes to a retaining wall for the last 15 meters.

Feature C is a multiple-stacked wall (0.8 to 1.5 meters high and 1 meter wide) located c. 33 meters *mauka* (and parallel) of feature B and may be the upslope continuation of feature A. This feature is c. 16 meters long and has 2-meter continuation 25 meters father upslope.

Feature D is situated *makai* of feature B at the edge of the meadow. It consists primarily of a multiple-stacked wall (42 meters long, 1.0 to 1.4 meters high on the N face, 0.3 to 0.5 meter high on the S face, and 0.5 to 1.3 meters wide), oriented *mauka-makai*. At a point 17 meters from the *mauka* (E) end of this wall, another multiple-stacked wall (0.8 to 0.9 meter high and 0.8 meter wide) radiates N-NE for 15 meters and at this point bisects a 5-meter-long retaining wall (0.8 meter high and 0.6 meter wide).

Feature E is a large, open terrace that measures c. 33 by 7 meters, with maximum heights of 0.4 meter on the interior and 0.5 to 1.4 meters on the exterior. It is 0.5 to 1.0 meter wide. It is bounded upslope by large-boulder talus, and to the E by a 3-meter, multiple-stacked wall. This wall curves to the N and becomes a retaining wall for 33 meters; it continues on the W for another 3 meters where it again becomes a multiple-stacked wall for 2.5 meters. Portions of this terrace appear to have been rebuilt (Fig. 14).



Fig. 14. WALL FACING, FEATURE E, SITE D7-22
(facing W).

Feature F, located 2 meters downslope from the NW corner of feature E, is a possible agricultural mound. It is composed of large boulders with cobble fill, and is 4 meters in diameter and 0.9 to 1.5 meters high. There appears to be a slightly modified natural terrace extending *makai* for c. 8 meters.

Feature G is a set of two parallel terraces extending NW for c. 17 meters. They appear to be modified natural terraces. Feature H, located c. 17 meters NW of feature G, is a multiple-stacked wall which is oriented N and curves slightly *makai* for 20 meters. It is 0.5 to 1.1 meters high, 0.5 to 1.0 meter wide, and constructed using naturally occurring boulders with medium boulders as fill.

Feature I continues the curve (6 meters from the *makai* end point of feature H) of feature H for 37 meters, at which point it rejoins the base of the talus. It continues along the base of the talus as boulder rubble for c. 10 meters with some possible modification) with a final 10-meter line of rubble curving *makai* along the base of the talus.

D7-23 POSSIBLE HAWAIIAN SHRINE

Lying immediately N of the present restaurant parking lot, this site consists of a contiguous assemblage of two earthen terraces, a boulder-faced slope, and a cobble-faced platform with pieces of branch coral scattered over its surface (Fig. 15). The platform is thought to be a Hawaiian shrine because of the coral on its surface. Although the site can be broken up into features, interfaces between features are indistinct because of the homogeneity of the rock construction material and the slumped character of many of the remaining walls. There are, however, enough remaining wall facings to allow an accurate reconstruction of the structure.

The N side of the site is delineated by a 1-meter-high, boulder slope, the top of which has been bulldozed. The slope is 12 meters long and is cut off by bulldozed rubble on the NE. At the base of the boulder slope lies a small (10 by 3.5 meters), dirt terrace, faced on the SE by a single-stacked wall, 0.3 meter high and c. 0.5 meter wide. The center portion of the dirt terrace appears alluviated over the top of this facing. SE of this first terrace lies another dirt flat which is faced on the S, leading to the speculation that it too was a terrace. The entire SE side of the structure appears to have been alluviated by soil washed from the cliff directly N of the site. Such alluvial action was observed during heavy thundershowers during the survey period. The W and SW portions of the site are the most distinct, comprised of a 2-meter-high, sloping, boulder wall, 5 meters long and 0.5 meter wide, which becomes a slumped facing for another 5 meters, then is sharply defined as a 1.3-meter-high platform facing. The platform itself measures 6 by 4.5 meters, and has a low depression on its SW side, probably caused by soil erosion beneath the platform.

Excavations

A band of charcoal-laden clay (6.5 meters long, 0.5 meter thick, and 0.75 meter below the present ground surface) was noted on the face of an

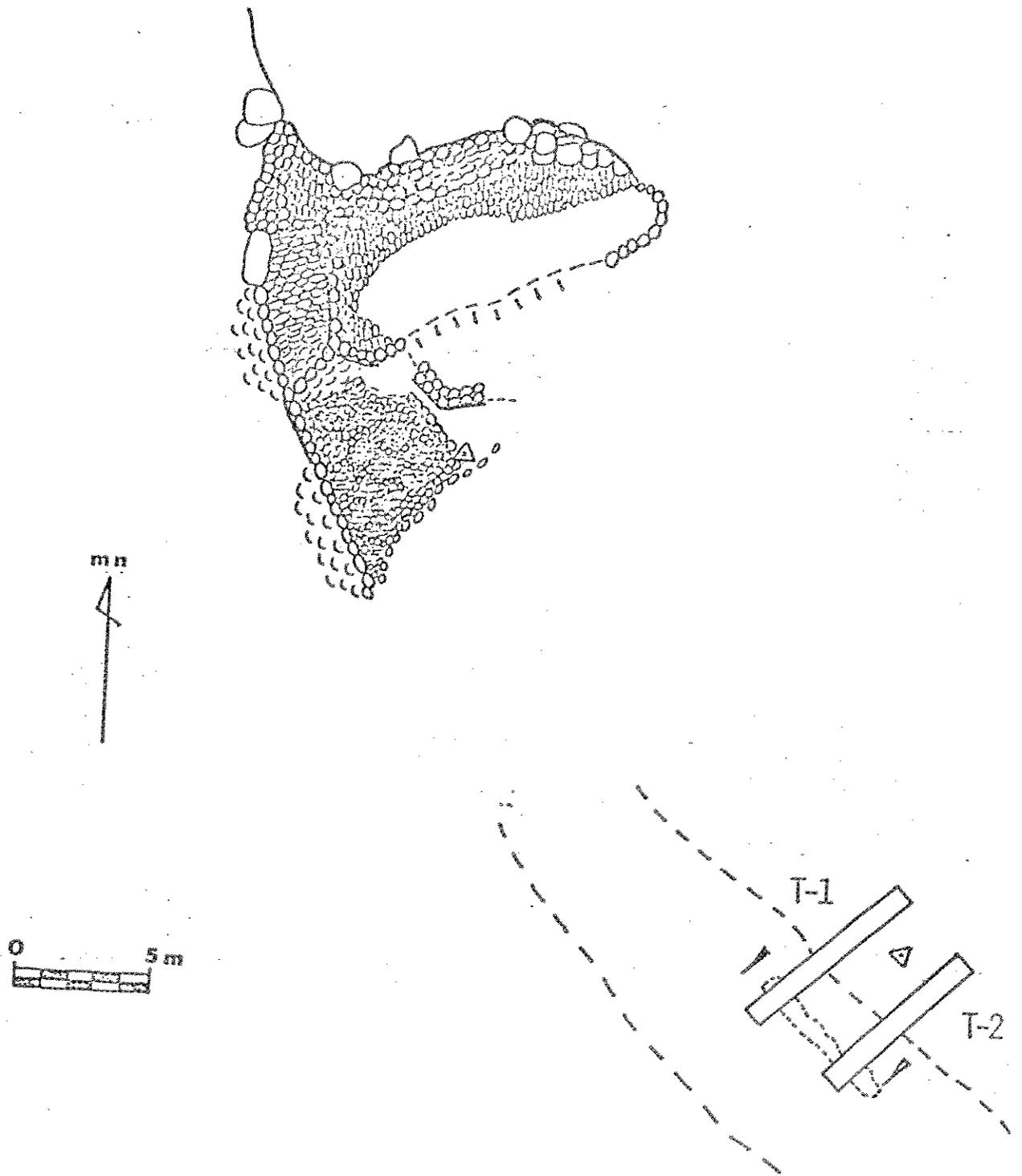


Fig. 15. PLAN OF SITE D7-23, POSSIBLE HAWAIIAN SHRINE.

embankment extending c. 30 meters SE of the platform at D7-23. This bank was test-excavated to a depth of 1.5 meters below ground surface by means of a backhoe. Two trenches (T1 and T2) 6.5 meters long, were cut into the bank parallel to each other and approximately 5 meters apart. Both trenches displayed similar three-layer stratigraphy (Fig. 16) which included:

- Layer I: Ground surface to c. 0.6 meter below surface; reddish-brown clay with occasional charcoal flecks throughout; marine shell and some historic artifacts also found
- Layer II: c. 0.6 meter to 1 meter below surface; grey-brown granular clay containing large amounts of charcoal; many marine-shell fragments and historic artifacts throughout
- Layer III: c. 1 meter to extent of excavation; tan clay, very compact and moist; presumably sterile.

Midden and artifacts were recovered mainly from layer II and its interface with layer I. Midden recovered included: fragments of cone shell (*Conus* sp.); cowrie (*Cypraea* sp.); *opihi* (*Helcioniscus* sp.); *pipipi* (*Nerita* sp.); and *Drupa* sp. Artifacts recovered were entirely historic in nature and included pottery sherds, fragments of bottle glass, a nail, a button, and a 0.30-caliber, brass, shell casing. A complete description of midden and artifacts appears in Appendix A.

Summary and Conclusions

The area around site D7-23 appears to consist of a series of extensive water-lain deposits, the upper two layers of which appear historic. The origin of layer I soils appears to be the *kula* lands (uplands) surrounding the valley. The presence of this layer may be due to the production of pineapples on the uplands beginning in the early 1900s. Layer II's extent and large charcoal content may indicate burning of a relatively large and mature stand of trees somewhere upstream of site D7-23 during the historic past.

The cultural material recovered indicates that a historic habitation once existed close to the site of test excavations T1 and T2. Further excavation at site D7-23 could be quite valuable, providing information regarding the age, function, and extent of the stone structure there.

D7-24 WALL

This is a remnant of a possible *kuleana* wall lying on a taluvial slope c. 30 meters above site D7-23 on the N side of the central valley. The wall, 0.7 meter wide and high, is crudely built of stacked boulders; it extends 25 meters from the base of the cliff downslope to a boulder outcrop where the wall ends. (A large talus fall immediately W of the

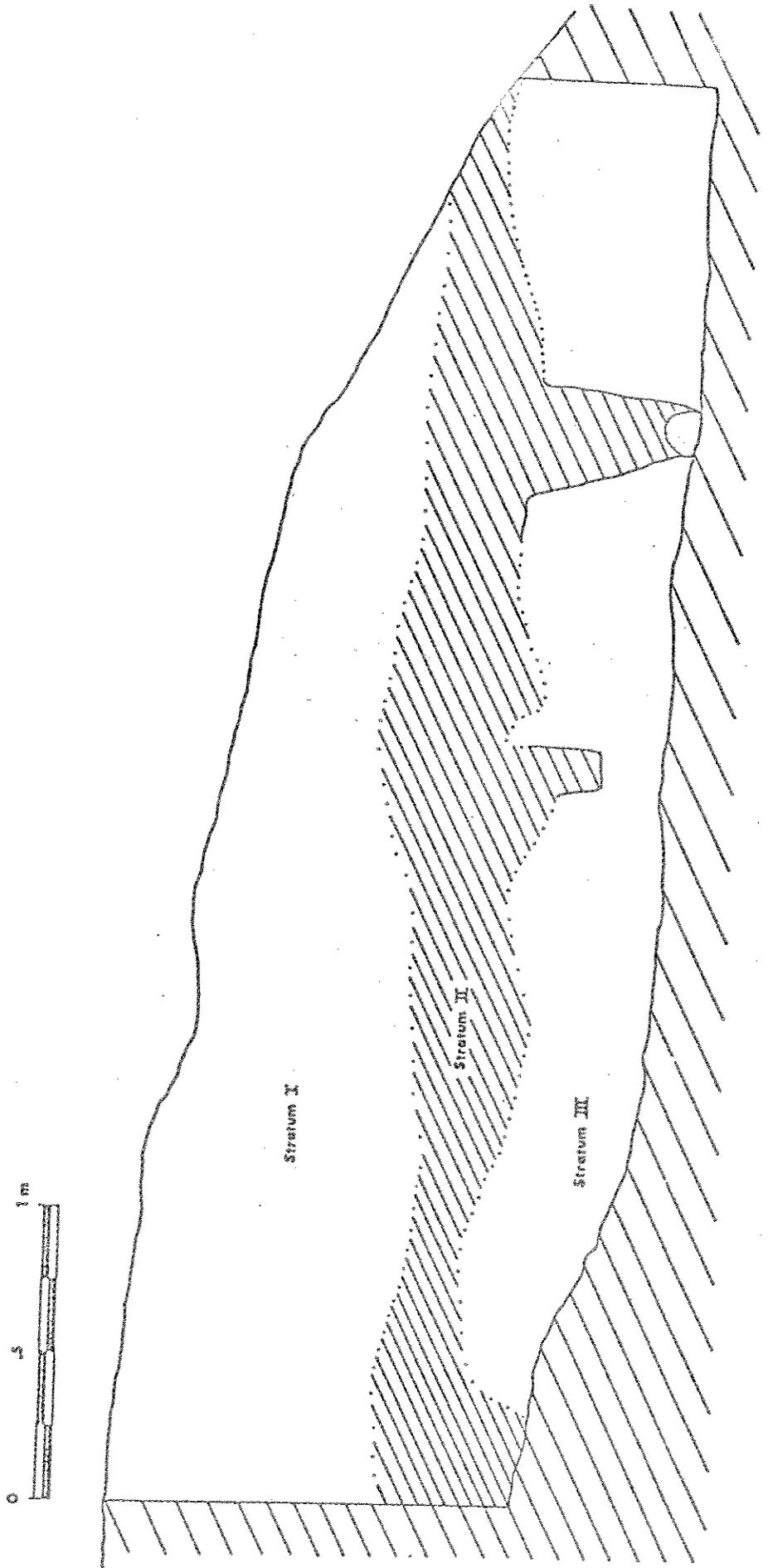


Fig. 16. SITE D7-23, PROFILE OF THE E FACE OF T-2.

outcrop may cover a lower wall.) This wall is similar in construction and situation to wall feature A of site D7-17, indicating that the two may be temporally related. Unfortunately, no records could be found to substantiate this speculation.

D7-25 WALLS

Located on the S side of the S valley, at the base of the talus, is a site composed of three wall segments which form a crude enclosure with the talus as the fourth side. The three features demonstrate different types of wall construction and do not appear to be contemporaneous.

Feature A is a well-faced, fragile, core-filled wall extending outward (N) from the base of the talus. It is 0.75 to 1.2 meters high on the *mauka* face, 0.5 to 0.7 meter high on the *makai* face, 1.2 to 2.0 meters wide, and c. 9 meters long. It is constructed with medium-to-large boulders as facing and cobble-to-small-boulder fill. The downslope end of this wall segment has collapsed.

Feature B extends *mauka* from the collapsed section of feature A and may possibly be either the remnant of a multiple-stacked wall or bulldozed rubble from an extension of feature A.

Feature C, a single-stacked, medium-boulder wall, measures c. 13 meters long, 0.6 to 0.8 meter high, and 0.6 to 0.8 meter wide. The wall extends from the *mauka* portion of feature B upslope to the talus.

D7-26 WALL COMPLEX WITH MOUNDS

Possible *kuleana* walls, terraces, short walls, depressed mounds, and several other mounds compose this site of the S side of the S valley at the second meadow (Fig. 17).

Four walls--located upslope of a bulldozed road--may possibly have been *kuleana* walls or part of an agricultural system. Features A, B, C, and D are roughly parallel to one another and run perpendicular to the cliff. They measure 10 to 22 meters long, 0.7 to 1.0 meter wide, and 0.5 to 0.7 meter high, and are generally constructed of multiple-stacked medium boulders.

Feature E may be the downslope continuation of feature D, which makes a NE curve at the edge of the meadow. It extends for c. 35 meters to form a 25- by 5-meter, dirt-filled terrace. The feature is a single-stacked, medium-boulder facing measuring 0.85 to 1.5 meter high and 0.65 to 1.1 meter wide.

Feature F abuts feature E on the W face, extending for 13 meters in a curve to create another terrace against the talus. The multiple-stacked, small-to-medium-boulder facing is 0.5 to 1.1 meters high and 1.0 to 1.5 meters wide. At the W end, the terrace facing curves to form a circular feature with a depressed center--3.5 meters in diameter and 0.4 meter deep.

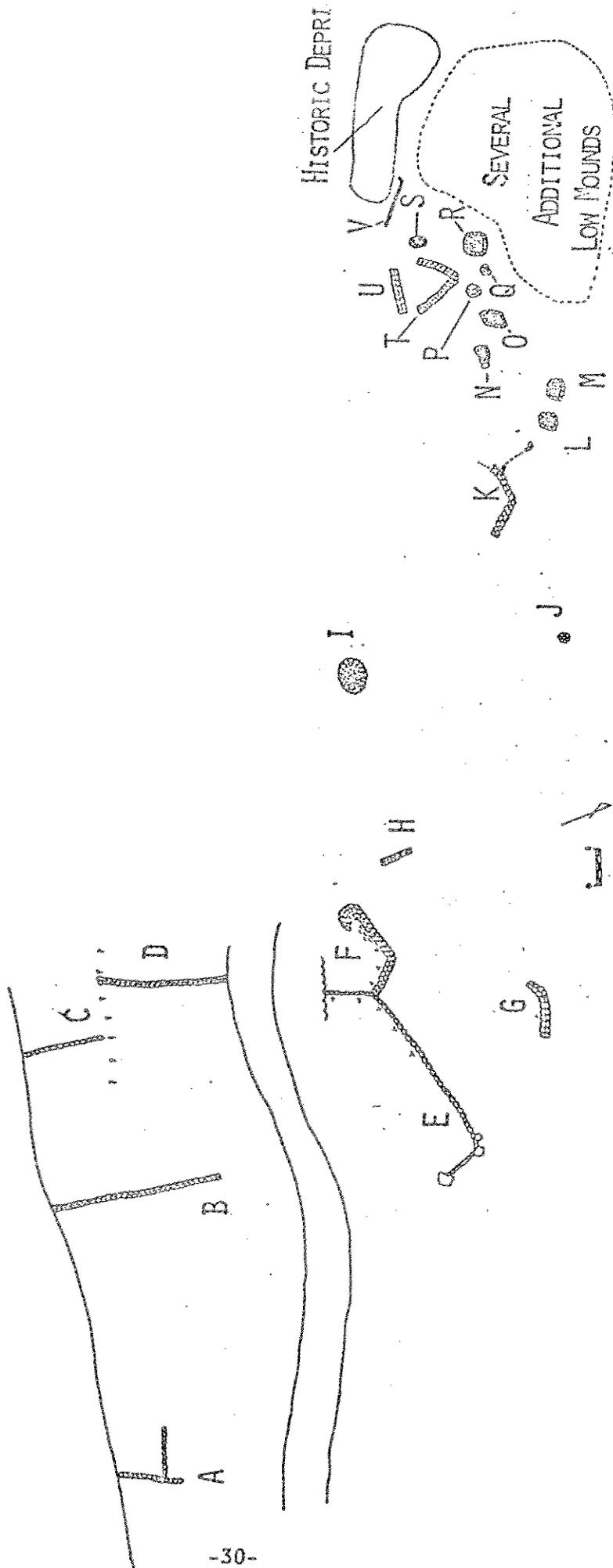


Fig. 17. PLAN OF SITE D7-26, WALLS AND MOUNDS.

Features G and H are poorly constructed, low, multiple-stacked walls. Feature G--8 meters long, 1.4 meters wide, and 0.35 to 0.6 meter high--may be the result of clearing the meadow, but the function of feature H is unknown. Feature H is 4 meters long, 0.3 meter high, and 0.7 meter wide.

Feature I, a depressed mound, is similar to part of feature F. Ovular in shape, this feature measures c. 3.5 by 4.5 meters and 0.4 meter deep.

Features J, L, M, N, O, P, Q, R, and S are various-shaped, multiple-stacked mounds of stones ranging from medium boulders to pebbles; these mounds measure from 1 to 3 meters in diameter and from 0.2 to 0.8 meter in height. These features may have been used for dry agriculture or they may be burials. Excavation is suggested to determine their use. Several additional mounds are in the area.

Feature K, located in the general area of the mounds, is a terrace--8 meters long, 0.8 to 1 meter high, and 0.8 to 1.5 meters wide. It may possibly be natural.

Features T, U, and V, terrace features, are located in close geographic proximity to one another and to a large quantity of historic material (5 to 15 years old). These features probably defined living surfaces for this most recent occupation and may have had other uses, if they were constructed at an earlier time. They measure 6 to 12 meters in length, 0.5 to 1.4 meters wide, 0.2 to 0.75 meter high, and are of multiple-stacked construction using large boulders to cobbles.

D7-27, -28, -29 PORTABLE ARTIFACTS

These sites identify the location of artifacts found by Mr. Lief Andersen, an employee of Waimea Falls Park. The artifacts include a small sandstone pounder, a small basalt adze, and a fragment of a stone grinding surface. The exact locus of these artifacts is unknown, as they were all subject to disturbance prior to being found. A detailed description of each artifact is included in Appendix A, while locational details of each find are included below.

D7-27-1 SANDSTONE POUNDER

This site is located in a bulldozed road cut just *mauka* of the third meadow in the S valley. The pounder was found in compacted soil in the road cut c. 20 meters *mauka* of where the cut joins the paved tram road. The pounder could have been exposed by bulldozing, in which case it could be related to walls in the area. However, the pounder could have been hand-carried to this area and thus no definite associations can be made.

D7-28-1 BASALT ADZ

This small, polished, basalt adz was found by Mr. Andersen during bulldozing operations just N of the new tram barn. While this area is subject to flooding, the adz does not display rounding of corners and edges characteristic of water transport, and thus may have been *in situ* prior to being unearthed by the bulldozer. Such basalt adzes were used by the Hawaiians as finishing tools in woodwork.

D7-29-1 GRINDING-STONE FRAGMENT

This artifact was found approximately abreast of the present nursery area on the N bank of Kamananui Stream, just above the first tram bridge. The original whole stone was apparently portable to some extent, as both sides of the fragment have "worked" concave surfaces. Grinding stones were used for the sharpening of basalt adzes, such as the one described above.

D7-30-1 'ULU MAIKA STONE

This polished Hawaiian gamestone fragment was found by park Assistant Manager Tom Shaw after the heavy thunderstorm of April 19, 1974. Located on the W bank of Kamanaiiki Stream as it crosses in front (*makai*) of the central dividing ridge, the stone appears to have been washed downstream and deposited at this site by floodwaters.

D7-31 and -32 POSSIBLE TERRACE & MOUNDS

These sites will be described together because they appear to be a contiguous area which is bounded on the N by Kamananui Stream, on the S by the base of the slope, on the E by site Oa-D7-33, and on the W by the first bridge. The tram road bisects this area, thus the two site designations--site 31 is N of the road and site 32 is to the S.

These sites contain several terrace features--low walls and stone alignments--in poor condition. These scattered features may possibly be remnants of an agricultural complex; therefore, a test excavation is recommended for this area to determine the use of these terraces.

Other features include three mounds located adjacent to the present tram road. The two on the N are basically single-stacked, circular alignments with pebble fill, whereas the third mound has a large boulder base with medium-to-small boulders forming a circular facing with pebble fill. They measure c. 1.5 to 2.5 meters in diameter and have a maximum height of 1 meter. These mounds may possibly be burials or they may have had an agricultural use, though they do not appear to be associated

with the terraces. The mounds are in fair-to-good condition and are well defined when contrasted to the rest of the site. Excavation is advised to determine the use of these features.

D7-33 COMPLEX

Site D7-33, a complex of walls, an enclosure, rock shelter, and associated structures, is located on the S side of the S valley, *makai* of the first meadow (Fig. 18).

Feature A is a short wall segment or low mound measuring 4.0 by 1.5 meters and 0.5 meter high. It is located within the N end of feature B.

Feature B, an enclosure--c. 7 by 22 meters--was constructed by incorporating large boulders with medium boulders to cobbles as fill. The wall varies from single-to-multiple-stacked with an interior height of 0.6 to 1.2 meters, 0.4 to 1.1 meters as the exterior height, and 0.4 to 1.0 meter in width. The E portion of this enclosure is somewhat unusual in that the interior face is vertical and the exterior face slopes out and down. It was suggested that this was an animal enclosure because this type of wall construction allows animals to enter or be placed within the enclosure and once in the enclosure, the vertical face prevents their escape. However, the generally low construction of these walls does not support this function. This feature also contains a small rock shelter located along the E face (c. 5 meters from the S face). An angled large boulder (4 by 2.5 meters) and the build-up of the facings creates an enclosed space of 1.6 by 0.8 meter and 0.6 meter high.

Feature C is a southern extension of the E face of feature B. This multiple-stacked wall is c. 23 meters long, 0.7 meter wide, and 0.4 to 0.8 meter high. It is constructed with a large boulder base and medium-boulder fill.

Feature D is a single-stacked wall of medium-sized boulders, located c. 2 meters N of the NE corner of feature B. It curves to the NE and is c. 7 meters long, 0.7 to 0.9 meter high, and 0.5 meter wide. At the NE end of this feature it widens to become a small platform (2 by 2 meters) with pebble fill on a boulder base.

Feature E is a crude, multiple-stacked, large-boulder wall measuring 12 meters in length, 0.7 to 0.9 meter high on the N face, 0.3 to 0.75 meter high on the S face, and 0.6 to 1.5 meters wide. The wall, oriented parallel to the tram road (8 meters to the N), is located at the NW portion of this site.

Feature F is located c. 10 meters S of feature E in a clearing. This feature is a large boulder (1.5 by 1 meter and 1.3 meters high) with several small boulders and cobbles located on top of it and surrounding the base. One small boulder was uprighted on top of this base by Mrs. M. Andersen, who believes that this is an *amakua* stone (personal communication: Lief Andersen).

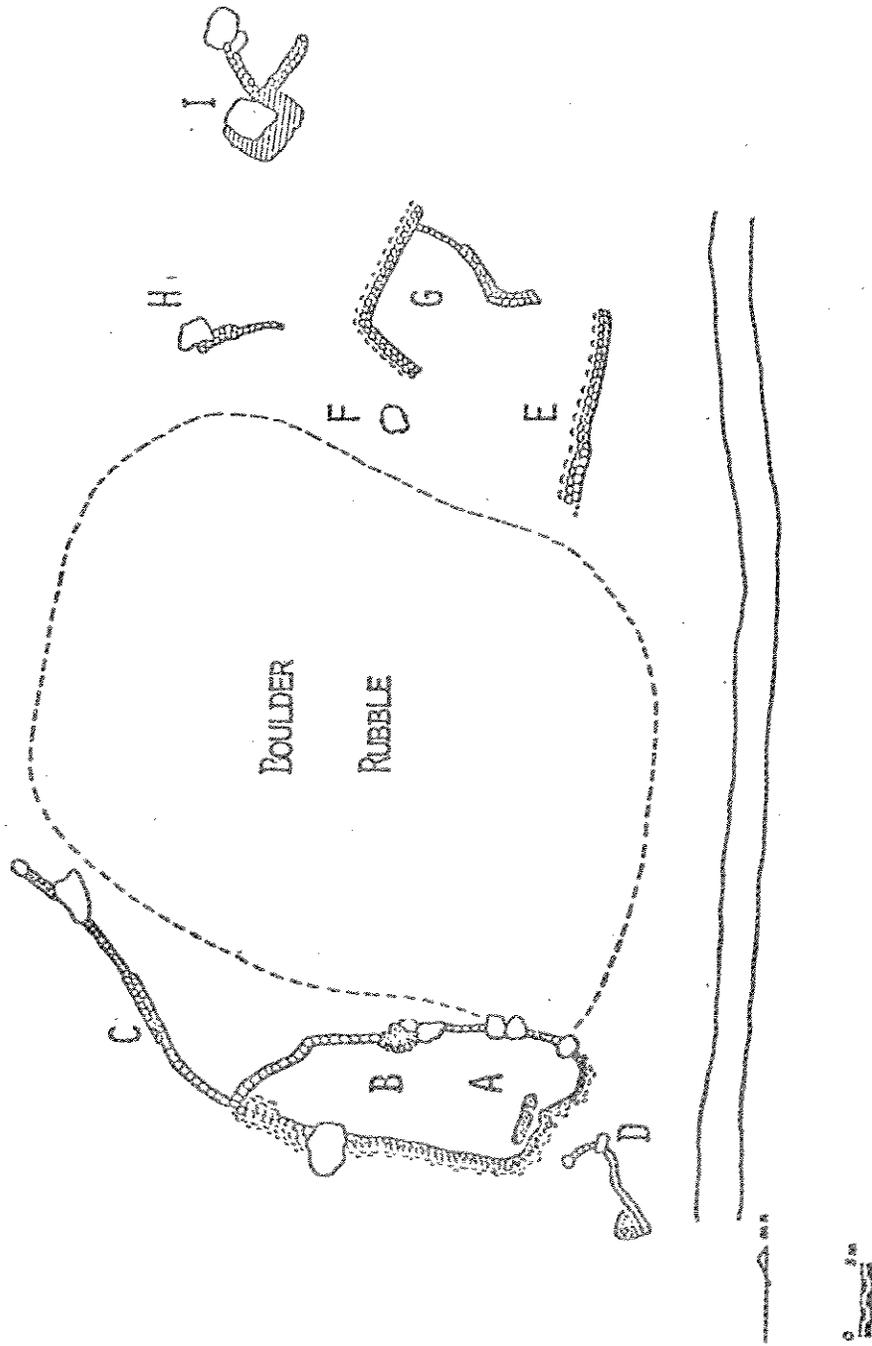


FIG. 18. PLAN OF SITE D7-33, COMPLEX.

Feature G is a composite of three connected wall segments which form a three-sided structure located in the area W of feature F and S of feature E. The walls are generally multiple-stacked with primarily large boulders as a base and medium-to-small boulders as fill. The first wall--12 meters long--is oriented SW. The next continues in a NW direction for c. 7.5 meters, at which point another wall (oriented NE) abuts it. The third segment, at 8 meters, changes direction to the N for 2.5 meters. The walls measure 0.5 to 1.2 meters high and 0.8 to 1.2 meters wide. The extent of this feature is obscured by the large-boulder rubble in this area.

Feature H is located c. 5 meters S of feature G near the base of the talus. This feature is a crude, multiple-stacked wall, constructed against a large boulder, which becomes increasingly deteriorated as it extends c. 5 meters in a NW direction. It measures 0.3 to 1 meter high and 0.6 to 1 meter in width.

Feature I is located at the base of the talus at the SW extent of this site. This feature is a rock shelter created by an angled, large boulder (2.5 by 3.5 meters) with a paving of large boulders to cobbles (1.2 meters wide) extending around the W and N to the SE perimeter of the large boulder. The opening to the shelter faces NW. The interior space measures 1 by 1 meter with a maximum of 1.3 meters in height. Two 4-meter walls radiate from the large boulder--one to the SW and the other to the NW. Constructed of multiple-stacked, large-to-small boulders, the walls vary in height from 0.6 to 0.8 meter and from 0.5 to 1.0 meter in width.

D7-34 WALL

This site, a wall, is located on the *mauka* perimeter of the first meadow on the S side of the S valley. The first 12-meter segment is oriented SW from a large boulder W of the tram road. It is a crude, medium-to-large boulder, single-stacked wall, measuring 0.6 to 1.3 meters high and 0.4 to 0.7 meter wide. The NW continuation is a boulder alignment--13 meters long, 0.5 to 1.1 meters high, and 0.4 to 0.8 meter wide.

This wall was recently constructed under the direction of Mr. Kruse, a previous valley owner (personal communication: Lief Andersen). There may have been an earlier wall here but its foundations were not visible to Lief when he helped construct the present wall. This wall is the one that was constructed to add to the Hawaiian appeal of the valley.

D7-35 ROCK SHELTER BURIALS

Located at the base of the cliff on the S side of the central valley, site D7-35 consists of three contiguous rock shelters overlooking the Park office and restaurant (Fig. 19). All three shelters (features A, B, and C) contain disturbed skeletal material in various states of decay.

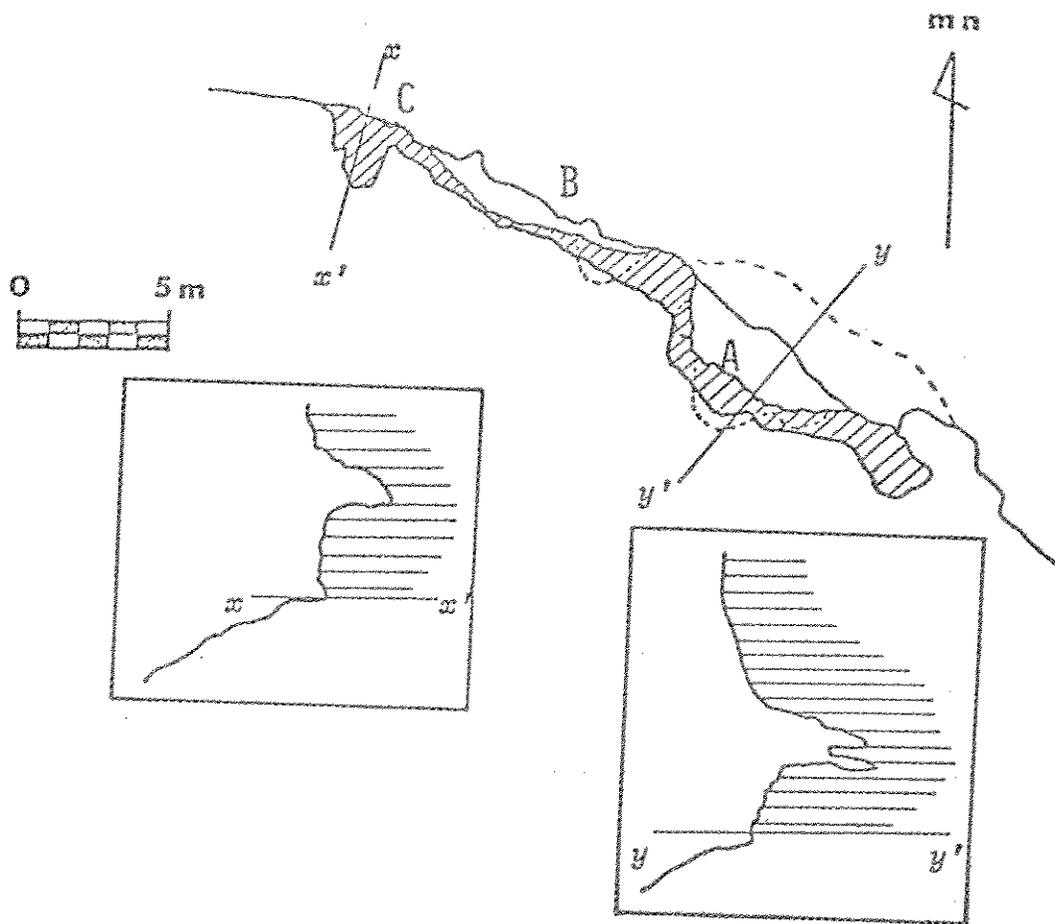


Fig. 19. PLAN AND CROSS SECTIONS OF SITE D7-35, ROCK-SHELTER BURIALS.

Feature A is the largest of the three shelters, being c. 6.5 meters long and from 2 to 3.5 meters deep and c. 1.5 meters high. McAllister noted, on visiting this feature in the 1930s that:

"... One site visited is merely a shelter with fragmentary skeletal material, decayed boards and a portion of a canoe. In the shallow dust of the floor are a few tapa fragments and bits of lauhala. The shelter is exposed to winds and rain and a well beaten path gives evidence of frequent visitors who have completely ransacked the site."

[1933: 147, site 246]

The canoe, boards, *tapa* and *lauhala* are now gone (Fig. 20) leaving only the skeletal material. These remains are still in fair condition and indicate that at least two individuals were interred here. The "shallow dust" layer referred to by McAllister has *opihi* (*Helcioniscus exaratus*) and *pipipi* (*Nerita picea*) shell fragments in it, as well as flecks of carbonized material which may be the remains of the vegetable matter that he reported. The shallow dirt on the cave floor has some potential for excavation, in spite of the disturbed nature of the site.

Feature B is a small (1 x 2 meters), rock shelter, located 3 meters *makai* of feature A. This shelter and feature C were apparently not noted by McAllister. Only a few human bones are located here, and these remains are in very poor condition.

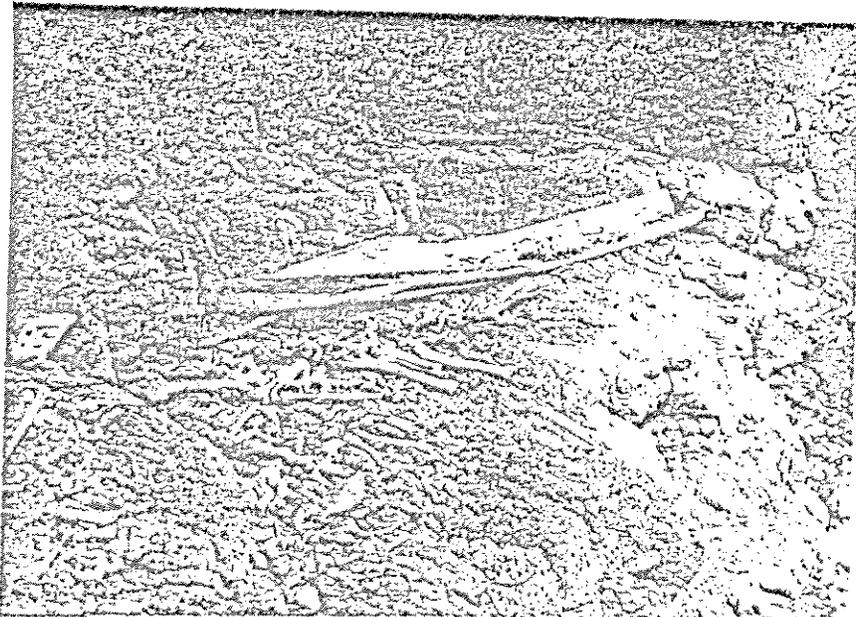
Feature C is the most difficult to get at of all the shelters, lying c. 10 meters *makai* of feature A along a narrow ledge. Shelter C is 2 meters wide and 2.8 meters deep, and 1.2 meters high. Two skeletons here are fairly undisturbed, but in poor condition due to exposure to rains. One of the skeletons is that of an adolescent male (by pelvic identification). Both burials appear to be flexed, primary burials, as most of the bones show some articulated order; however, no skulls were noted, so the site may have been tampered with.

D7-36 WALL

This possible *kuleana* wall runs from directly below rock shelter D7-35-C on the S cliff of the central valley to the base of the taluvial fan c. 35 meters away (Fig. 21). Trending due N, the wall exhibits great variation in construction and state of repair. Near the cliff, the wall is built of multiple-stacked boulders and is in good condition, averaging 1 meter in height and 0.7 meter wide. The middle portions of the wall are in poor condition and generally broken down, averaging only 0.3 to 0.6 meter high and 0.8 meter wide. The lower-wall section is comprised of crudely stacked boulders, c. 0.5 to 0.8 meter high and 0.7 meter wide, and in fair condition. The wall ends just above the bulldozed road on the S side of the valley. A winding, concrete stairway, 12 meters long, extends up the



a. Photo taken May 10, 1974 (facing NW).



b. Photo taken in 1930s [McAllister, 1933, plate 9].

Fig. 20. ROCK SHELTER, FEATURE A, SITE D7-35.

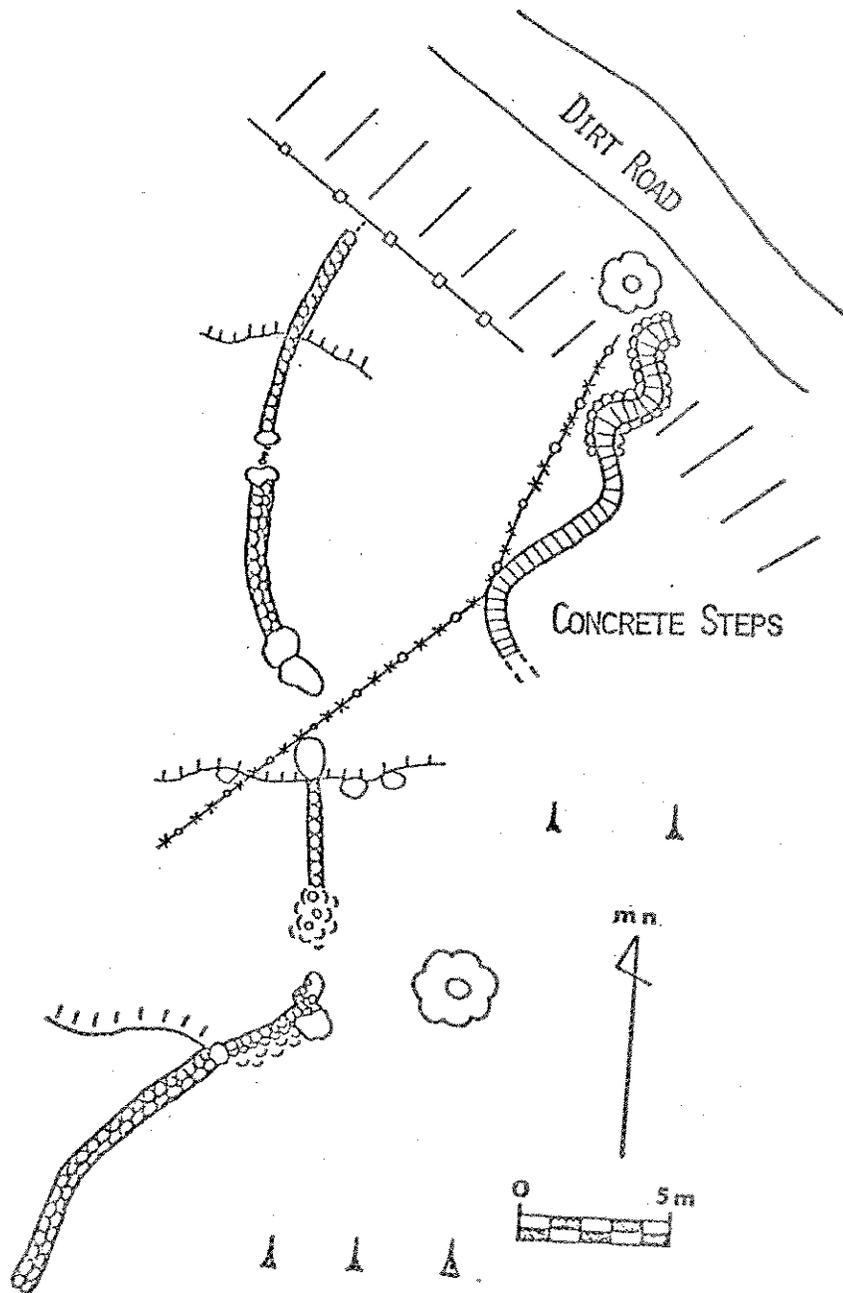


Fig. 21. PLAN OF SITE D7-36, WALL.

taluvial slope from the road cut on the E side of the wall. According to Park Manager Roberts Leinau, the stairway was built by a previous owner of the valley to gain access to the rock shelters above.

D7-37 BURIAL SHELTERS & CAVE WITH ASSOCIATED TERRACES

Comprised of ten features, including one cave and four rock shelter burials, this site runs *makai* c. 100 meters along the taluvial slope and lower cliff area in the S central valley, c. 220 meters *makai* of the lower tram turnaround near the new restaurant. Other features include: crude stone terracing, which was probably related to dry-agriculture practices, and three cobble-and-pebble-paved areas that may represent habitations (Fig. 22). These paved areas require further study before a more detailed identification can be made.

Feature A is a remnant of a possible living area (mentioned above). Delineated by a rectangle of cobble paving 1.5 by 2.5 meters, it is located on a flat at the base of the taluvial fan. The N portion of the paved area appears to have been disturbed by the bulldozed roadcut 4 meters away.

Feature B is a terrace wall running from the base of the cliff directly under burial cave feature E to the bulldozed roadcut, c. 30 meters to the NW. In the initial 5 meters of the wall's length, it acts as a 0.9-meter-high facing for a dirt terrace to the E. The wall then turns NE and becomes a 1-meter-high, single-stacked-boulder retaining wall for 20 meters. In the final 5 meters of the wall's length, construction changes to massive, single-stacked boulders, 1 meter high. The wall is in fair-to-good condition.

Feature C is a 3-meter-long, 0.6-meter-high, single-stacked, boulder-faced terrace, possibly used for dry agriculture.

Feature D is a well built, boulder platform, 2.5 meters long and 1.1 meters high, lying among large talus boulders. The platform surface is neatly paved with small boulders and cobbles. Its function is unknown.

Feature E is a burial cave located 8.5 meters up the face of the cliff. McAllister recorded this cave in 1933, noting that:

"A little farther along, this path leads to a cave which is probably less frequented, though a small wooden ladder leads from the path to the mouth of the cave. It is approximately 50 feet long, with one bend, with remnants of coffins near the mouth. Skulls and long bones and any remnants of material culture that may have been placed with the remains have been removed. At the back end of the cave a pile of decayed skeletal material was

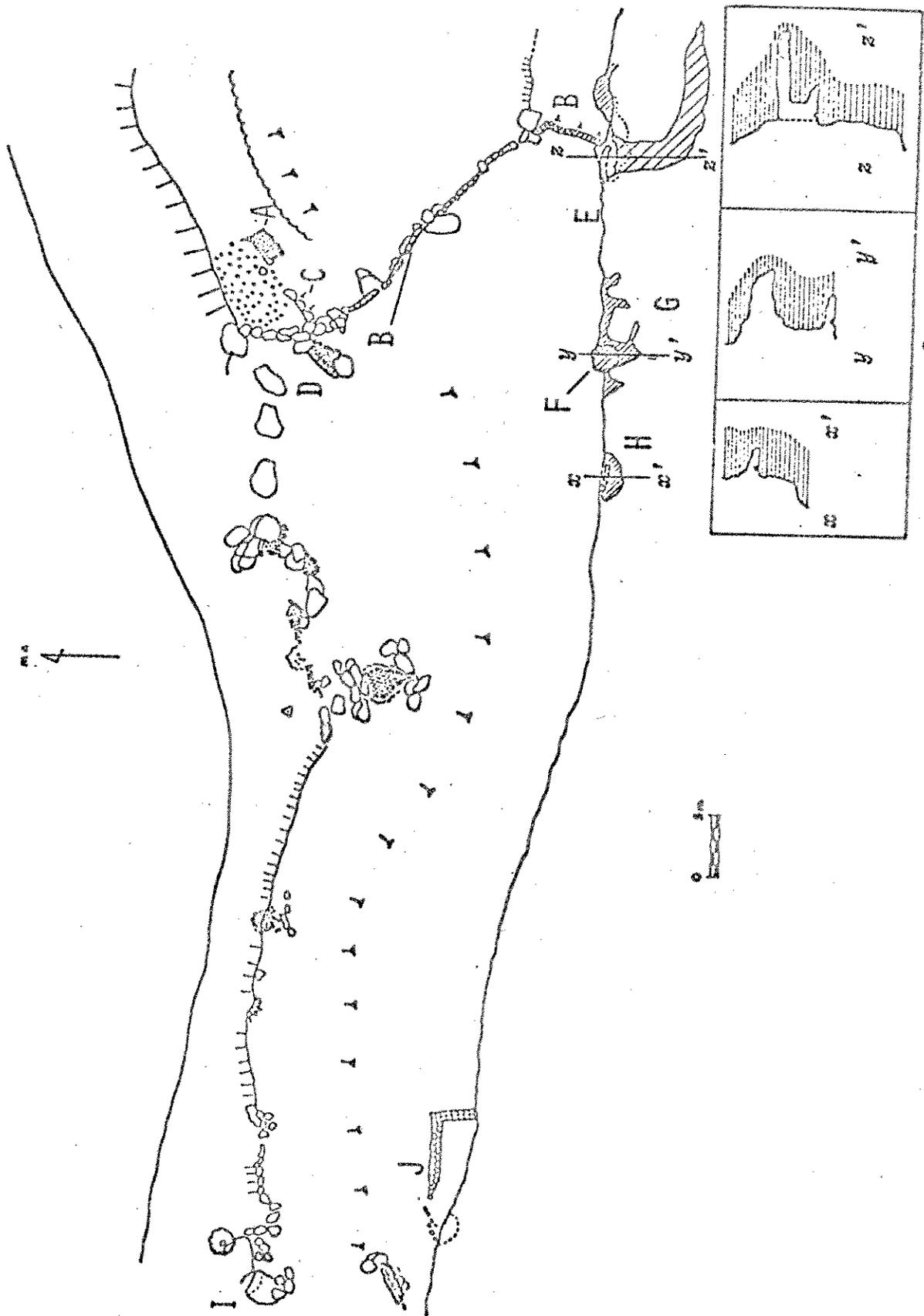


Fig. 22. PLAN AND CROSS SECTIONS OF SITE D7-57, BURIAL SHELTERS AND CAVE WITH TERRACES.

found, possibly bundle materials. The cave is extremely damp, with a small stream of water trickling down the center, and any material would quickly deteriorate there."

[1933: 147, site 246]

With the exception of two sections of planking (0.015 meter thick, 0.2 meter wide and approximately 0.7 meter long) and a human molar, all the remains reported by McAllister are either missing or in advanced states of decay due to the extreme wetness of the cave. A pile of planking similar to that found in the cave was found at the foot of wall B at the edge of the bulldozed road. This planking is possibly the remains of one or more of the coffins reported by McAllister.

Feature F is a small (2 by 1.5 meters), rock-shelter burial located in the cliff face at ground level, 15 meters W of cave feature E. Long bones and vertebrae from one individual are present in fair-to-good condition. The 0.8-meter-high entrance to the shelter appears to have been closed off at one time.

Feature G is another rock-shelter burial located 5 meters directly above shelter F. Ten meters long and up to 3 meters deep, this shelter contains the remains of at least three individuals, scattered about the main chamber. One section of the shelter has collapsed, and may overlie additional remains. Skeletal material is very mixed, with the majority of bones remaining being small ribs, vertebrae, and hand and food bones.

Feature H is a rock-shelter burial c. 2.5 meters W of cave E, located 3 meters above the ground in the cliff face. Approximately 1.5 meters deep, this shallow indentation appears to have been robbed, as only one left rib and scattered bone fragments remain. This shelter was also possibly walled off at one time, as there is a line of cobble rubble along the entrance.

Feature I is a human burial under a huge, flat, boulder, adjacent to the road below enclosure J. A few long bones remain here, indicating this might have been a "bundle" or secondary burial.

Feature J is a 9-meter-long, 3.5-meter-wide enclosure abutting the cliff, c. 80 meters W of cave E. The enclosure is open to the W, and both the N and E walls are low (c. 0.4 meter high) and in poor condition. The base of the enclosure wall was probably formed by rock fall from the overhanging cliff face. The entire enclosure is littered with historic debris, and appears to have been recently occupied by transients.

D7-38 ROCK SHELTER

This site lies along the taluvial slopes of the S central valley c. 375 meters *makaí* of the lower tram turnaround next to the new

restaurant. Eight features are found here, including the rock shelter, two platforms, a midden deposit, and a wall (Fig. 23). Artifacts include a piece of worked basalt and two glass bottles, indicating some type of human occupation. Excavation at this site could give some idea as to the nature and time of this occupation.

Feature A is a small, crudely faced platform (2 by 2 meters and 0.6 meter high), covered with stone and dirt rubble from a roof cave-in.

Feature B is a single line of stones, c. 0.3 meter in height, that might represent an old wall alignment.

Feature C is a crude, stacked facing (0.4 meter high and 0.5 meter wide) on the NE side of the rock shelter. This facing acts as a retainer for feature D, the midden deposit. Scattered throughout the soil and pebble fill are *opihi* (*Helcioniscus exaratus*), *pipipi* (*Nerita picea*), Cowry (*Cypraea* sp.), and *Conus* sp. shell fragments. Also included in the midden are bottle-glass sherds, blue-and-white decorated pottery, and a pair of small scissors. The "X" on the plan view given in Fig. 22 shows the location of the piece of worked basalt (D7-38-D1) that was found.

Feature E identifies the location of a piece of blue bottle glass, D7-38-E1.

Feature F identifies the location of a broken Rain. Beer Bottle, D7-38-F1.

Feature G is a natural rock outcrop (5 by 2 meters) that forms a platform under a cliff overhang. No cultural material was found here.

Feature H is a 15-meter-long, single-stacked, boulder wall running N from the E side of platform G. The wall is from 0.3 to 1 meter in height, and is in fair condition. This wall appears to have been cut off by the bulldozed road, and may represent an old *kuleana* boundary.

D7-39 DRY-AGRICULTURE COMPLEX

This site is located on the lower face of the prominent bluff called Kaluahole, on the S side of the central valley (c. 450 meters *makai* of the lower tram turnaround). The eleven features that comprise this site lie in a zigzag pattern up the nose of the bluff to an altitude of c. 30 to 40 meters (90-120 feet) above the valley floor (Fig. 24). At this height, the upper features (J and K) command a fine view of the lower central valley and river mouth. With the exception of platform J (described below), all features at this site appear to be dry-agriculture structures.

Feature A is a stony, dirt-filled terrace, c. 15 meters long, with a single-stacked-boulder facing. The facing slopes inward toward the back of the terrace in several places, and is in fair condition. The terrace trends NE-SW and averages 1 meter in height, ending on the NE side directly below feature B.

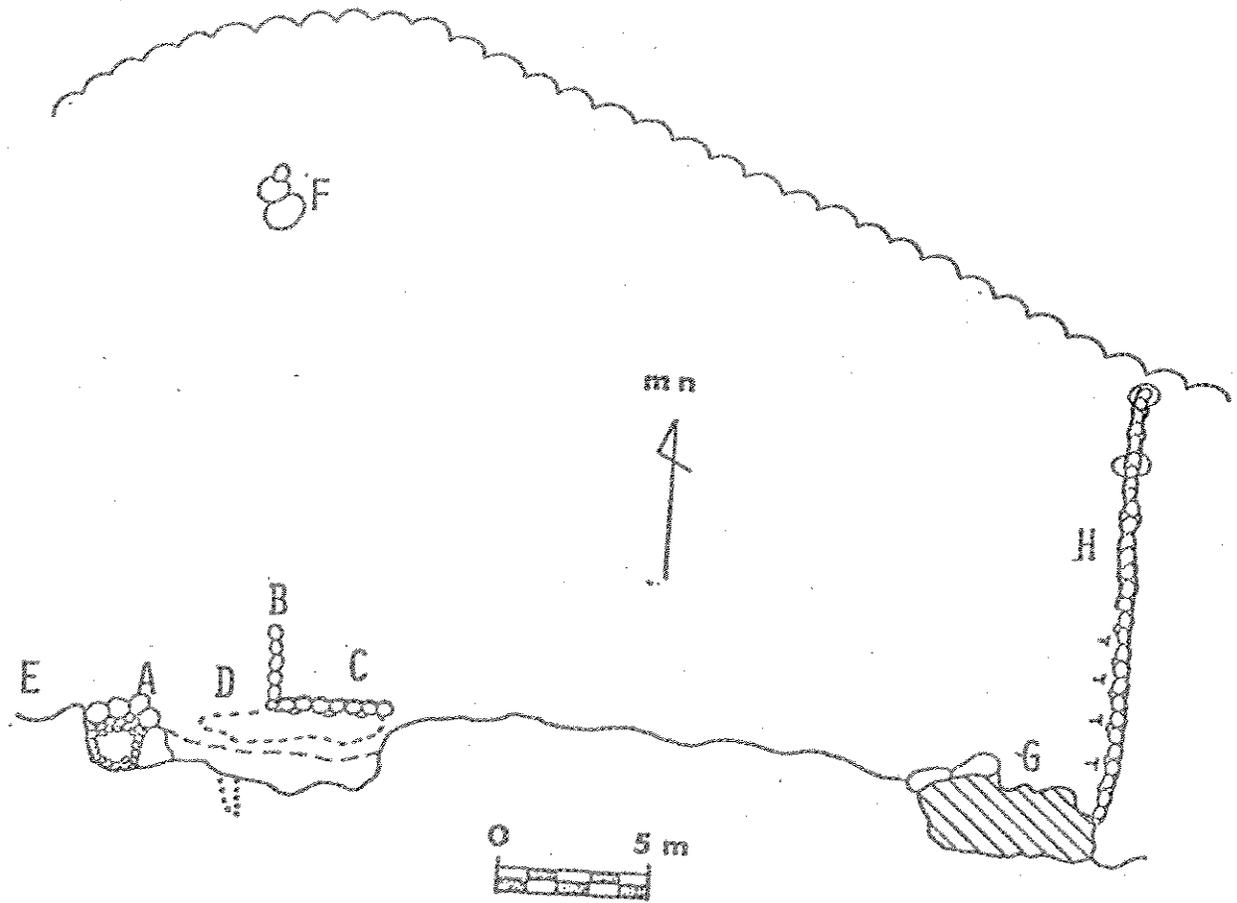


Fig. 23. PLAN OF SITE D7-38, ROCK SHELTER.

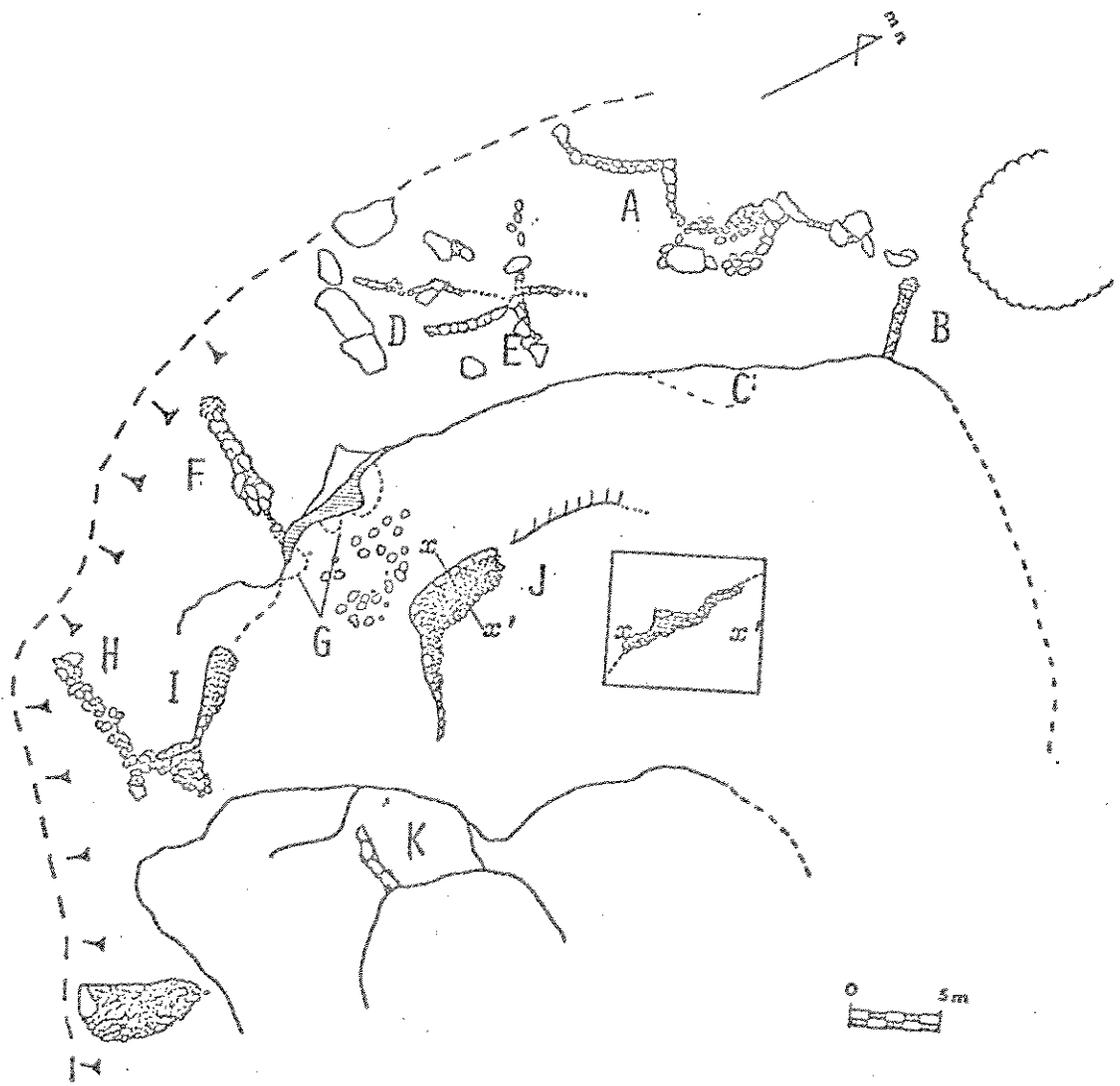


Fig. 24. PLAN OF SITE D7-39, DRY-AGRICULTURE COMPLEX.

Feature B is a multiple-stacked wall, 4 meters long, running NW from the base of the cliff. The wall is in good condition, standing c. 0.8 meter high, and may have been a boundary structure.

Feature C is a rock shelter (5 meters wide, 2 meters deep, and 1.2 meters in height) located in the cliff face at ground level. No cultural remains were seen.

Feature D is a 6-meter-long, 0.8-meter-high, dirt terrace with a single-stacked boulder facing. A 1-meter segment in the center of the terrace face is broken down. This and other terraces appear to be dry-agriculture features.

Feature E is a narrow, dirt-filled terrace, 1.5 meters wide, 7 meters long, and 1.1 meters high. It is backed by a talus fan spilling out from the slope above. The terrace facing is constructed of stacked boulders that slope slightly inward.

Feature F is a massive, multiple-stacked-boulder wall, 8 meters long, 1.5 meters wide, and 1.5 meters high on the downslope side. The wall's upslope side has been alluviated, and is only 0.8 meter high. The wall's E abutment at the cliff is even with the surface on the upslope side, presumably for access to and from the slopes.

Feature G is a series of contiguous rock shelters lying above wall F. No cultural material was found in any of the shelters.

Feature H is a crude, multiple-stacked wall, 8 meters long and 0.9 meter high, that is a bounded extension of feature I.

Feature I is a boulder terrace 6.5 meters long and c. 0.7 meter high. The terrace is well faced by stacked boulders. The NW portion of the terrace stands free of the slope at its downslope end, forming a small, boulder platform.

Feature J is a boulder platform on a steep slope on the nose of the bluff. A low (0.5 meter) wall runs down the slope on the S side of the platform. The platform is 1.1 meters high on the downslope side and is well faced. The excellent vantage afforded a viewer from this point hints that this platform may have been some kind of observation point rather than an agricultural feature.

Feature K is a crude, 1.1-meter-high, stacked facing on a boulder outcrop. It may have functioned as a protective wall to prevent rock fall to the platform below.

SUMMARY AND CONCLUSIONS

As shown on the survey map (Fig. 1), a total of 32 archaeological sites were located during the survey. Over one-third of these related to dry-agriculture technology. Almost all of the remaining sites pertain to historic features or are cave burials. The one major exception to this is site D7-23, a possible Hawaiian shrine.

Excavations carried out at site D7-23 indicate that a considerable amount of flooding occurred around the structure during historic times-- a finding borne out by several accounts of severe flooding in the valley during the late 1800s. Unfortunately, the flooding appears to have destroyed or alluviated possible pond-field agriculture systems used to grow taro in ancient times [Handy & Handy, 1970: 463, -4]. Thus, although there is little archaeological evidence to indicate that wet taro played a major part in Hawaiian economic activity in the lower valley, most areas which could have supported wet-taro agriculture have been disturbed or destroyed, leaving only the alluvial slopes for archaeological investigation. There is one area, however, in the S valley at site D7-22, that might still have wet-terrace remains. This area was known as Ka'ili'ili, and was supposed to have the largest terrace area in the valley [Handy & Handy, 1970:464]. Future investigations in this area may reveal ponded soils and help balance the archaeological picture of the valley.

Based on the dry-agriculture remains, it can be concluded that the Hawaiians were growing a great many dryland crops along the valley's slopes, including the sweet potato and dryland taro. Other crops, including banana, sugarcane, 'awa, and breadfruit, would have grown well in this area.

Marine shell and coral found in several sites (D7-23, -35, -37, -38) confirm historic and legendary accounts of the valley's importance in fishing, and support the obvious conclusion that people in the lower valley had access to the ocean for sources of protein.

Rock shelter D7-38 indicates the possibility that some Hawaiians used caves in Waimea at least temporarily as habitation and/or stone-tool-making areas, as evidenced by the shell midden and worked basalt found there. Excavation at this site may increase our knowledge of early habitation and activities in the Waimea Valley area.

RECOMMENDATIONS

As Waimea Valley is envisioned as a historic and botanical park, we recommend that all sites located during the survey be preserved and stabilized where necessary to prevent natural and human agencies from disrupting them. Restoration, including the clearing of ground cover, rebuilding of stone features, and restocking of areas with aboriginal plants and artifacts will be indicated where needed in the following list. The stone structures were built without mortar; therefore, visitor access to sites should be planned in such a way as to avoid direct contact with stone features. Site preservation and visitor safety and interest should be maximized. Catwalks, railings, and informational signs are some of the ways that this could be accomplished.

This section makes use of a four-category evaluation system* to expedite site description and prevent undue repetition:

Category I: Sites which are suitable as focal points of planned park development

Category II: Sites which are archaeologically significant but require further study before being implemented into park plans; sites in this category must be studied and then reclassified into Category I or III

Category III: Sites which do not require additional archaeological survey or investigation

Category IV: Burial sites.

The following abbreviations are used to indicate location of sites within the valley:

NV = North valley (Kamanaiki Stream)	NS = North side
SV = South valley (Kamananui Stream)	SS = South side
CV = Central valley	

Site No.	Description	Location	Evaluation
D7-7	ROCK SHELTER BURIALS	CVNS	IV

It is recommended that burials be preserved and protected from looting and vandalism. This could be accomplished by planting thorny vegetation around caves and shelters, sealed or barred entrances, and signs in appropriate areas reminding visitors of the respect due to burials of any culture. State law requires that all burials exhumed by construction be properly re-interred.

* Modified after Bevacqua and Dye (1972).

Site No.	Description	Location	Evaluation
D7-8	HISTORIC ENCLOSURE	NVSS	III
	No additional archaeological survey required.		
D7-9	WALL AND TERRACE COMPLEX	NVSS	II
	Preserve; a test excavation is recommended for feature E to determine the use of this terrace.		
D7-10	WALLED ENCLOSURE	NVSS	II
	Preserve; this enclosure (feature A) appears to be constructed over a stone alignment (feature B). A test excavation at the intersection of these features would be useful in establishing the relationship between these two features and their function.		
D7-11	WALLS AND HISTORIC REMAINS	NVSS	III
	No additional archaeological survey is required.		
D7-12	WALLS AND HISTORIC REMAINS	NVSS	III
	Preserve; the features in this site are in good condition though they should be stabilized. This area is associated primarily with the Japanese occupation of the valley.		
D7-13	JAPANESE SHRINE	NVSS	II
	Preserve; this site is in good condition and should be maintained as a point of interest.		
D7-14	DRY-AGRICULTURE MOUNDS	NVNS	III
	Preserve; could be incorporated as a point of interest in park development.		
D7-15	DRY-AGRICULTURE MOUND	NVNS	III
	Preserve; could be implemented into future park plans, but would be difficult for some visitors to reach due to the steep slope on which it lies.		
D7-16	DRY-AGRICULTURE COMPLEX	NVNS	I
	Preserve and restore; this large area is well situated in terms of visitor access and has good potential for displaying how ancient Hawaiians lived and what dry crops they grew. Walls and facings are in good condition and require only limited rebuilding and stabilization. Emphasis should be placed on ethnobotanical accuracy, in keeping with the park's botanical importance. This site is large enough for a truly important display of indigenous Hawaiian cultigens. Excavation at knoll feature J may provide relevant information concerning a possible habitation there.		

Site No.	Description	Location	Evaluation
D7-17	WALL AND DRY-AGRICULTURE SLOPE WITH TERRACING	SVNS	III
	Preserve; no further archaeological survey required.		
D7-18	TERRACED SLOPE	SVNS	III
	Preserve; no further archaeological survey required.		
D7-19	DRY-AGRICULTURE TERRACES	SVSS	II
	Preserve; excavations in these terraces could test the dry-agriculture function advanced for these features; could be incorporated into future park plans as a point of interest.		
D7-20	DRY-AGRICULTURE MOUND	SVSS	II
	Preserve; this visually rather unimpressive mound has some archaeological interest and could be excavated to determine its function.		
D7-21	WALLS AND TERRACES	SVSS	III
	In poor condition, this site should possibly be stabilized to control further deterioration.		
D7-22	WALL AND TERRACE COMPLEX	SVSS	III
	Preserve; these walls and terraces present the best evidence for a wet-agriculture system based on the good condition of the surface remains and documentation in historic sources. Therefore, excavations are recommended to substantiate these claims and possibly lead to reconstruction and restoration.		
D7-23	POSSIBLE HAWAIIAN SHRINE	CVNS	I
	Preserve, stabilize, and restore. Excavation in and around structure may identify temporal setting and expose possible E extension of present structure. May be the one most important site in the valley. Visitor access and impact is obvious.		
D7-24	WALL	CVNS	III
	No further archaeological survey necessary.		
D7-25	WALLS	SVSS	III
	No further archaeological survey is needed for this site.		

Site No.	Description	Location	Evaluation
D7-26	WALL COMPLEX WITH MOUNDS	SVSS	II
	<p>Preserve and restore; this site is partially obscured by dense Christmas berry. Clearing the vegetation is first recommended to allow closer examination which would include test excavations of feature F, feature I, and a few of the mounds. Features F and I are unusual in their design and may relate to a specific use and time period. The mounds may be part of a dry-agriculture system or possibly burials; therefore, it is suggested that some excavation be devoted to them to determine their use. There are sufficient and varied surface remains in fair to good condition to warrant restoration.</p>		
D7-27, -28, -29 and -30	PORTABLE ARTIFACTS		III
	<p>No further archaeological work is required</p>		
D7-31 and -32	POSSIBLE TERRACE AND MOUNDS	SVSS	III
	<p>Preserve, in general, the features in this site are in poor condition and do not need further attention. The mounds are exceptions. They may be burials or agricultural features and should be excavated to determine their use. They are in fair to good condition and do not appear to be associated with the rest of the site.</p>		
D7-33	COMPLEX	SVSS	II
	<p>Preserve; individual features have been identified, but their interrelationship is not understood. Excavation in enclosure feature B may help in understanding the function of this feature. This area could easily be incorporated into park plans.</p>		
D7-34	WALL	SVSS	III
	<p>No further archaeological survey required.</p>		
D7-35	ROCK-SHELTER BURIALS	CVSS	IV
	<p>Preserve; foregoing statements regarding burials apply here (see D7-7).</p>		
D7-36	WALL	CVSS	III
	<p>No further archaeological survey required.</p>		

Site No.	Description	Location	Evaluation
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D7-37	BURIAL SHELTERS AND CAVE WITH ASSOCIATED TERRACES	CVSS	IV
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Preserve; burials should be handled in accordance with foregoing statements. The paved areas (feature A and the two additional unlettered features adjacent to the road in Fig. 22) would be investigated to determine if they are old living platforms. This area could be incorporated into park plans for historic trails, etc., with the assumption, of course, that the burial features associated with this area be presented in a sensitive manner.

D7-38	ROCK SHELTER	CVSS	II
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Preserve; excavation in midden deposit (feature D) may help in determining this area's history. Could be implemented into park plans. If excavation produces sufficient data, reconstruction could be feasible.

D7-39	DRY-AGRICULTURE COMPLEX		III
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Preserve; steep slope and rather fragile condition of some remains makes this site slightly less attractive for park interests because of the danger of someone falling or being struck by dislodged rocks from above. These dangers aside, site has a very good view and could be a point of interest for hikers.

REFERENCES

- Bevacqua, Robert F. and Thomas S. Dye
1972 "Archaeological Reconnaissance of Proposed Kapoho-Kalapana Highway, District of Puna, Island of Hawaii. Report 72-3, Department of Anthropology, Bernice P. Bishop Museum.
- Handy, E. S. Craighill
1940 *The Hawaiian Planter: vol. 1.* Bernice P. Bishop Museum Bulletin No. 61. Honolulu.
- Handy, E. S. Craighill, and Elizabeth Green Handy
1972 *Native Planters in Old Hawaii: Their Life, Lore, and Environment.* Bernice P. Bishop Museum Bulletin No. 233. Honolulu.
- McAllister, J. Gilbert
1933 *Archaeology of Oahu.* Bernice P. Bishop Museum Bulletin No. 104. Honolulu.

APPENDIX A.

LIST OF ARTIFACTS FOUND IN WAIMEA VALLEY

All measurements in cm.

SITE 50-Ca-D7-10

BISHOP MUSEUM ARCHAEOLOGICAL SPECIMEN RECORD

SHEET NO. 1 of 1

No.	Specimen	Material	Description	lgt	width	thick-	date
				ht	diam	ness	
A-1	bottle	glass	clear-green 5-piece mold trademark on base 24 ①-4	25.5 cm.	4.5	7.5	
A-1	fragment	white glass	white glass w/ 3 green stripes = (C-1?)	5.9	5.5	0.7	"
A-2	fragment	white glass	white glass	7.7	5.7	1.2	"

All measurements in cm.

SITE 50-0a-D7-11

BISHOP MUSEUM ARCHAEOLOGICAL SPECIMEN RECORD

SHEET NO. 1 of 3

No.	Specimen	Material	Description	lgt	width	thick-	date
				ht	diam	ness	
A-1	bottle (top broken off)	glass	clear 5-piece mold at least a 3 piece mold green Japanese (?) characters on base	280	2.5	7.5	
A-2	bottle	glass	clear (green tint)	233	2.5	6.3	
A-3	bottle (top broken off)	glass	5-piece mold near base "15 II"	243	2.5	6.5	
A-4	bottle	glass	clear (green tint)	200	3.3	6.3	
A-5	bottle	glass	amber. remnants of metal wrapping at the mouth of bottle.	265	2.7	7.8	
B-1	bottle	glass	clear 5-piece mold	290	2.5	6.5	
B-2	bottle	glass	blue - a rectangular shaped base with circular impression bottom "T.M." on front possibly Japanese characters	8.2	1.75	1.7	
C-1	bottle	glass	clear 4-piece mold (?)	295	2.5	7.7	
C-2	bottle (top broken off)	glass	clear 5-piece mold dark green	290	2.6	7.7	
C-3	bottle	glass	2-piece mold (?)	225	2.9	6.5	
C-4	bottle	glass	clear - screw top, around bottle - "MELLIN'S FOODS" "BOTTLED U.S. 10/19/1920"	155	4.3	8.0	
C-5	bottle	glass	clear	240	2.5	6.3	
C-6	bottle	glass	clear (blue tint)	280	2.5	7.5	
C-7	bottle	glass	clear dark green	240	2.5	6.3	

All measurements in cm.

SITE 50-Ca-D7-11

BISHOP MUSEUM ARCHAEOLOGICAL SPECIMEN RECORD

SHEET NO. 2 of 3

No.	Specimen	Material	Description	1st	width	thick-	date
				ht	/diam	ness	
C-8	bottle	glass	brown	24.0	2.5	7.6	
				25.0	2.5		
D-1	bottle	glass	green 5 piece mold	25.0	2.5	6.5	
D-2	bottle	glass	brown 5-piece mold	25.0	2.5	6.6	
D-3	bottle	glass	green 2 piece mold(?)	25.0	2.5	6.7	
D-4	bottle	glass	aqua tint 5 piece mold on base: PCGW 4	24.0	2.6	6.5	
D-5	bottle	glass	lilac tint - 5 piece mold screw on top	23.5	2.6	7.0	
E-1	bottle	glass	clear - appears to be an ink bottle.	6.0	1.7	5.7	
E-2	bottle	glass	green - depressed bottom -	30.5	3.0	7.7	
E-3	bottle	glass	green tint - square base - on 1 face - MONOGRAM SALAD OIL SWIFT & CO. U.S.A.	29.0	2.7	7.3b, 7.3	
F-1	bottle	glass	blue on face BRONC-SELTZER 5 piece mold - EMERSON DRINK CO.	17.0	4.5	6.8	
F-2	bottle	glass	clear on face SALAD OIL BALTIMORE, MD. WILHELM REE BALTIMORE U.S.A.	13.7	3.5	6.2, 6.7	
	cont.						

All measurements in cm.

SITE 50-Ca-D7-11

BISHOP MUSEUM ARCHAEOLOGICAL SPECIMEN RECORD

SHEET NO. 3 of 3

No.	Specimen	Material	Description	1st	width	thick-	date
				ht	/diam	ness	
F-3	bottle	glass	clear	14.5	2.7	5	
F-4	bottle	glass	clear-green tint 5 piece mold	24.0	2.5	6.1	
F-5	partially broken bottle	glass	clear 5 piece mold	14.0	5.7	6.5	
F-6	Japanese tea cup	porcelain	white with black drawing of house and fence surrounded by a pine forest. Part of the base & side is broken off.	7.0	6.2	4.0	
F-7	bottle	glass	clear-green tint 5 piece mold	29.3	2.6	7.5	appears to be the same
F-8	bottle	glass	clear - pale green tint 5-piece mold	29.3	2.6	7.5	type of bottle
F-9	bottle	glass	clear - pale green tint 5-piece mold	29.3	2.6	7.5	

All measurements in cm.

SITE 50-CR-D7-12

BISHOP MUSEUM ARCHAEOLOGICAL SPECIMEN RECORD

SHEET NO. 1 of 3

No.	Specimen	Material	Description	1st h	width	thick-	thick-	thick-	date.
				nes	/diam	ness	ness	ness	
A-1	(top-chipped) bottle	glass	brown "DAI NIPPON BREWERY CO LTD" 5-piece mold on base - 	23.5	2.5	Base diam 7.95	1/16		
A-2	fragment (top broken off)	pottery	white glaze w/ blue design - 	5.0	3.5	0.3			
B-1	bottle	glass	clear on base - M&L 2	19.0	Lip -	Base diam 6.0			
C-1	bottle	glass	green 5-piece mold on base - 268	23.0	Lip -	Base diam 6.5			
D-1	lock	metal		5.0	3.5	1.2			
E-1	bottle	glass	clear "Waiialua Soda Works on base Waiialua, T.H." 5-piece mold "Waiialua"	20.5	Lip -	Base diam 6.0			
E-2	bottle (bottom broken off)	glass	clear "Waiialua Soda Works LTD." on base - G	18.5	Lip -	Base diam 5.2			
E-3	bottle	glass	clear on base - G screw top 5-piece mold	18.0	Lip -	Base diam 5.2			
F-1	bottle	glass	clear light green "Light Sunshine Soda Works Honolulu, T.H." 5-piece mold on base - 	20.0	Lip -	Base diam 5.95			
G-1	fragment (crack frag. scattered)	pottery	beige glaze 6-1  - Stamp on crack 6-2	16.5	4.0	1.5			
G-2	rusted	pottery	beige glaze	31.0	17.5	1.5			
H-1	rusted rectangular piece	metal		8.4	5.0	1.5			
H-2	rusted pot	metal	 - old kettle?	11.0	Base diam 11.0	Base diam 6.5			
H-4	spoon	metal		23.0	8.7	.15			
H-5	bottle (top half broken off)	glass	brown "DAI NIPPON BREWERY CO LTD" on base - 13 	15.0	Base -				

D7-12

SITE 50-CR-D7-12

BISHOP MUSEUM ARCHAEOLOGICAL SPECIMEN RECORD

SHEET NO. 2 of 3

No.	Specimen	Material	Description	1st h	width	thick-	thick-	thick-	date.
				nes	/diam	ness	ness	ness	
H-6	(top half broken off) bottle	glass	brown "DAI NIPPON BREWERY CO LTD" on base - 	12.0	Base -	Base diam 9.5	1/16		
H-7	(top broken off) bottle	glass	clear near base - 20 5 5	22.0	Base -	Base diam 5.2			
H-8	(top broken off) bottle	glass	brown near base - 18 5 21	15.0	Base -	Base diam 6.5			
H-9	(top broken off) bottle	glass	clear "OK SODA WATER CO. LTD. Honolulu, T.H." on base - 	13.2	Base -	Base diam 5.7			
H-10	(top & base chipped) bottle	glass	clear square shape on base -  pencil mark?	16.0	Lip -	Base diam 6.8			
H-11	(top chipped) bottle	glass	clear square shape screw top	12.7	Lip -	Base diam 4.2			
H-12	(top broken off) bottle	glass	clear square shape screw top	12.4	Lip -	Base diam 4.1			
H-13	bottle	glass	clear	15.5	Base -	Base diam 5.5			
H-14	fragment	glass	clear top portion to Kerosene lantern?	12.0	2.0				
H-15	fragment	glass	clear - function unknown	13.8	10.0				
H-16	fragment	glass	clear - function unknown	12.0	9.5				
H-17	fragment	glass	clear - cut glass look	9.5	5.5				
H-18	top of bottle	glass	pale green - lip-chipped with 2 part mold	12.2	Base -	Base diam 2.7			
H-19	fragment	glass	clear - up piece to base of something - from view	14.5	Base -	Base diam 4.9			
H-20	bottle fragment	glass	clear-top section - Japanese characters on base (reconstruction)	17.0	Lip -	Base diam 6.1			
H-21	fragment	glass	clear - bottom section 	-	-	-			

All measurements in cm.

SITE 50-Cu-D7-12

BIRCH MUSEUM ARCHAEOLOGICAL SPITHEM RECORD

SHEET NO. 3/13

No.	Specimen	Material	Description	lgth /ht.	width /diam.	thick- ness	date
H-22	Fragment	pottery	blue & green on off white glaze part of rice bowl	9.5	7.5	.5	7/74
H-23	Fragment	pottery	dark green glaze part of rice bowl	5.5	4.8	.5	"
H-24	Fragment	pottery	white glaze - blue swirl design on inside part of rice bowl	12.2	8.5	.8	"
H-25	Fragment	pottery	beige glaze, blue & green design on part of rice bowl outside	12.0	6.2	.7	"
H-26	Fragment	pottery	beige glaze - blue & green design on part of rice bowl outside	12.0	7.2	.7	"
H-27	Fragment	pottery	white glaze blue and pink design - outside part of chawan	7.5	6.2	.8	"
H-28	Fragment	pottery	white glaze - blue & pink design - outside part of chawan	7.5	6.0	.8	"
H-29	Fragment	pottery	white glaze blue floral design - outside part of rice bowl	9.0	6.2	.6	"
H-30	Fragment	pottery	white glaze - blue design outside part of rice bowl	7.7	6.0	.6	"
H-31	Fragment	pottery	white glaze blue & pink design on outside part of chawan	6.2	4.4	.7	"
H-32	Fragment bottle	pottery	white glaze blue floral design - outside part of chawan	6.3	5.0	.5	"
H-33	neck	glass	clear - at least of a 4 piece mold.	4.0	^{1.6} 2.1	-	"
H-34	Fragment	pottery	white glaze - part of tea cup on base "ENGLAND"	8.7	6.3	1.0	"
H-35	Fragment	pottery	white glaze - black leaf design on outside part of rice bowl	6.4	5.7	.5	"

D7-12

M.L.C.

No.	Specimen	Material	Description	lgth /ht.	width /diam.	thick- ness	date
A-1	Fragment	pottery	white glaze part of rice bowl	9.0	4.5	.9	7/74
B-1	Fragment	pottery	white glaze part of bowl - medium	8.0	7.5	.8	"
C-1	Fragment	pottery	white glaze with white, red, & black floral design small handle attached.	8.0	5.4	.3	"
C-2	Fragment	pottery	white glaze - crazed	7.0	4.1	.3	"
C-3	Fragment	pottery	white glaze - crazed	7.3	6.5	.3	"
C-4	cover of handle	metal	with top handle "small pot cover"?	3.5	idem.	-	"
D-1	disk	glass	milky white "REPRODUCED FROM JAR COMPANY, NEW YORK"	-	idem.	.3	"
E-1	bottle	glass	green top missing no identifying marks	28.5	base diam. 7.7	-	"
E-2	bottle bottom missing	glass	clear "WINDY" "WINDY" "WINDY"	8.5	base diam. 3.5	-	"
E-3	bottle top missing	glass	clear - on front "WINDY" "WINDY" "WINDY"	11.0	base diam. 5.1	-	"
E-4	Fragment	glass	opaque - possibly side view of bottle. on side - "SOCIETY"	9.0	7.5	.9	"
E-5	base of bottle fragment	glass	opaque - base of bottle	7.5	6.5	.8	"
E-6	Fragment	glass	off-white glaze possibly top of cork	3.0	base diam. 2.7	1.0	"
E-7	Fragment	pottery	white glaze with green & blue design part of rice bowl	9.5	6.5	.7	"
E-8	Fragment	pottery	white glaze - blue and brown stripes on both possibly part of rice bowl	8.0	6.5	.7	"
E-9	Fragment	pottery	white glaze - blue & brown stripes on possibly part of rice bowl	8.5	6.2	.5	"

No.	Specimen	Material	Description	lgth	width	thick-	date
				hgt.	diam.	ness.	
E-10	Fragment	pottery	white glaze - blue stripes on outside part of rice bowl	8.1	7.0	.7	"
E-11	Fragment	pottery	white glaze - blue stripes on inside part of rice bowl	7.2	4.7	.7	"
E-12	Fragment	pottery	off white glaze - crazed	8.5	4.6	.5	"
E-13	Fragment	pottery	white glaze with green & blue design part of rice bowl	8.5	4.4	.7	"
E-14	Fragment	pottery	white glaze with blue & green design part of rice bowl	5.7	4.3	.7	"
E-15	Fragment	pottery	off white glaze - grey & blue design	3.9	3.0	.4	"
E-16	Fragment	pottery	white glaze with blue design	3.0	2.5	.5	"
E-17	Fragment	pottery	white glaze with blue design up fragment	4.2	3.0	.25	"
F-1	bottle	glass	brown on find bottom - Net contents 11 1/2 oz. 100 cc	24	16.4	2.5	"

All measurements in cm.

SITE 50-ca-D7-16

BISHOP MUSEUM ARCHAEOLOGICAL SPECIMEN RECORD

SHEET NO. 1 of 1

No.	Specimen	Material	Description	lgth	width	thick-	date
				hgt.	diam.	ness.	
A-1	bottle	glass	clear-pinkish tint 3 piece mold - no markings	28.5	2.8	8.0	
A-2	bottle (top broken off)	glass	dark amber deep pontil (scal. 0.3cm) no visible mold lines	13.5	3.0	7.5	
A-3	bottle (partial base)	glass	dark amber - similar to A-2 deep scal - no visible mold lines	10.0	-	7.5	
A-4	bottle	glass	dark amber - similar to A-2 & A-3 - depressed base - there appears to be a mold line around base -	10.0	-	7.5	

All measurements in cm.

SITE 50-ca-D7-22

BISHOP MUSEUM ARCHAEOLOGICAL SPECIMEN RECORD

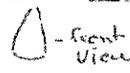
SHEET NO. 1 of 1

No.	Specimen	Material	Description	lgth	width	thick-	date
				hgt.	diam.	ness.	
A1	bottle	glass	brown no visible seams	30.0	2.5	7.6	
A-2	bottle	glass	blue-green - 3 piece mold for base then top bubbles in glass applied } top	18.5	2.3	6.0	

TRAUTMAN LEMONADE BOTTLES CO
HONOLULU
H.I.

D7-29; D7-30

Sheet No. 1 of 1

No.	Specimen	Material	Description	lgth	width	thick-	hts	diag	mass	date
28-1	adze	dark diorbasalt	quadrangular, pointed, back broken. fine grain basalt - probably wasn't shaped.	6.0	1.9	1.4			4.10	24
29-1	possible grinding stone	basalt	grinding surfaces on both sides.	10.5	7.5	4.5				
30-1	Ulukouka frag.	dark basalt	major fragment. 1 surface and partial rim.	7.5	3.0					
27-1	ponder	sand- stone	base partially broken off; 	11.0	9.0					
23-1	Ponder	sand stone	top broken off; curved base. 	11.0	11.0	4.5				

All measurements in cm.

SITE 50-Ca-D7-33

BISHOP MUSEUM ARCHAEOLOGICAL SPECIMEN RECORD

SHEET NO. 1 of 1

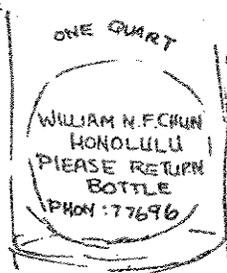
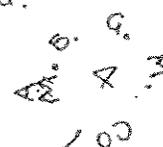
No.	Specimen	Material	Description	lgth	width	thick-	hts	diag	mass	date
A-1	bottle	glass	clear - pontile scar - rectangular base 3 piece mold circular top. cross-section of base. 	12	2.7	5.0	2.7			

All measurements in cm.

SITE 50-Ca-D7-38

BISHOP MUSEUM ARCHAEOLOGICAL SPECIMEN RECORD

SHEET NO. 1 of 1

No.	Specimen	Material	Description	lgth	width	thick-	hts	diag	mass	date
A-1	bottle	glass	clear. milk bottle 3 piece mold on base. 	24.5	5.5	9.5	0			
E-1	top broken off bottle	glass	aqua at least a 3 piece mold. on base. 							
F-1	top broken off bottle	glass	brown: 3 piece mold on base SB&C Co 2. 	10.3		7.0				
D-1		basalt	fine-grained basalt displaying direct percussion flaking on sides - possible prep. for adze heads.	3.3	3.0	1.1				

ADDENDUM 4

THE HISTORY OF WAIMEA VALLEY, OAHU

by

ANNE H. TAKEMOTO

Prepared for
BISHOP CORPORATION
Honolulu, Hawaii

June 1974

Department of Anthropology
BERNICE P. BISHOP MUSEUM
Honolulu, Hawaii

PREFACE

In mid-March, 1974, Bishop Museum employed this writer to prepare a historical study on Waimea Valley, Oahu, which would be included with the archaeological field survey conducted for Bishop Corporation. To assist in the historical research, the Museum hired two Hawaiiana enthusiasts, Meryl Andersen and Charles Kenn. Meryl Andersen contacted and interviewed several former residents of the North Shore; Charles Kenn taped some of the interviews and translated Hawaiian documents from the State Archives.

Documentary material was researched in several locations--the microfilm room of Hamilton Library (University of Hawaii); the Hawaiian and Pacific Collection, Sinclair Library (University of Hawaii); State Archives (where Agnes C. Conrad, State Archivist, and her staff helped in finding some of the more difficult sources); Bishop Museum library (where Judy Reed, head librarian, and her staff extended their cooperation and assistance); and the Hawaiian Mission Children's Society, (with the assistance of Lela Goodell, Librarian). The State Archives and Bishop Museum library reprinted the photographs used with this report. The staff at Division of State Parks allowed me to go through their site evaluation folders, and Donald Camp of Oceanic Properties, Inc. not only consented to an interview concerning Castle & Cooke's role in Waimea, but also made available a topographical map and documents from their files on Waimea Valley and suggested interviews with other employees of Waialua Agricultural Company. In the State Surveyor's Office, after extensive search undertaken by the staff there, one land-court map of the valley was uncovered; this map suggested that *kuleana* were taken from even older maps which were not available. Without the help of Rudolph K. Espinda, Registrar for Land Court, and Herbert Ewaliko of the State Department of Land and Natural Resources, the sections concerning land titles in Waimea would have little coherency and depth.

Thanks should be given especially to Bishop Corporation for the opportunity, encouragement, and cooperation in preparing this report. Bob Leinau of Waimea Falls Park and his staff not only supplied the taped interview of Abigail Kaleiheana but also spent much time and energy assisting me in gathering the names and addresses of the informants of the valley. Thanks are also extended to the informants themselves: Edward Matsumoto, George Souza, Earl Nishimoto, and Donald Camp, for kindly allowing us to interview them. Special thanks goes to Francis Kipapa Brown who gave us an interview and designated burial-cave and artifact locations.

Without the cooperation of the archaeologists in the field and the advice and expertise of the Museum staff (especially Marion Kelly, Dorothy Barrère, John Wright, Pat Bacon, and Dr. Yoshihiko Sinoto), the report would not have the dimension or fullness it now has. Last, I wish to thank my sister, Helene Y. Takemoto, for acting as volunteer photographer at the interviews and as a volunteer researcher frantically taking notes as the deadline approached.

Interpretation and errors of this report are the responsibility of this writer and do not reflect in any way the invaluable help and resources available for the report.



Fig. 1. WAIMEA VALLEY IN THE 1920s, SHOWING THE OLD METAL BRIDGE
BETWEEN THE VALLEY AND THE OLD RAILROAD TRACKS.
Photo from the State Archives.

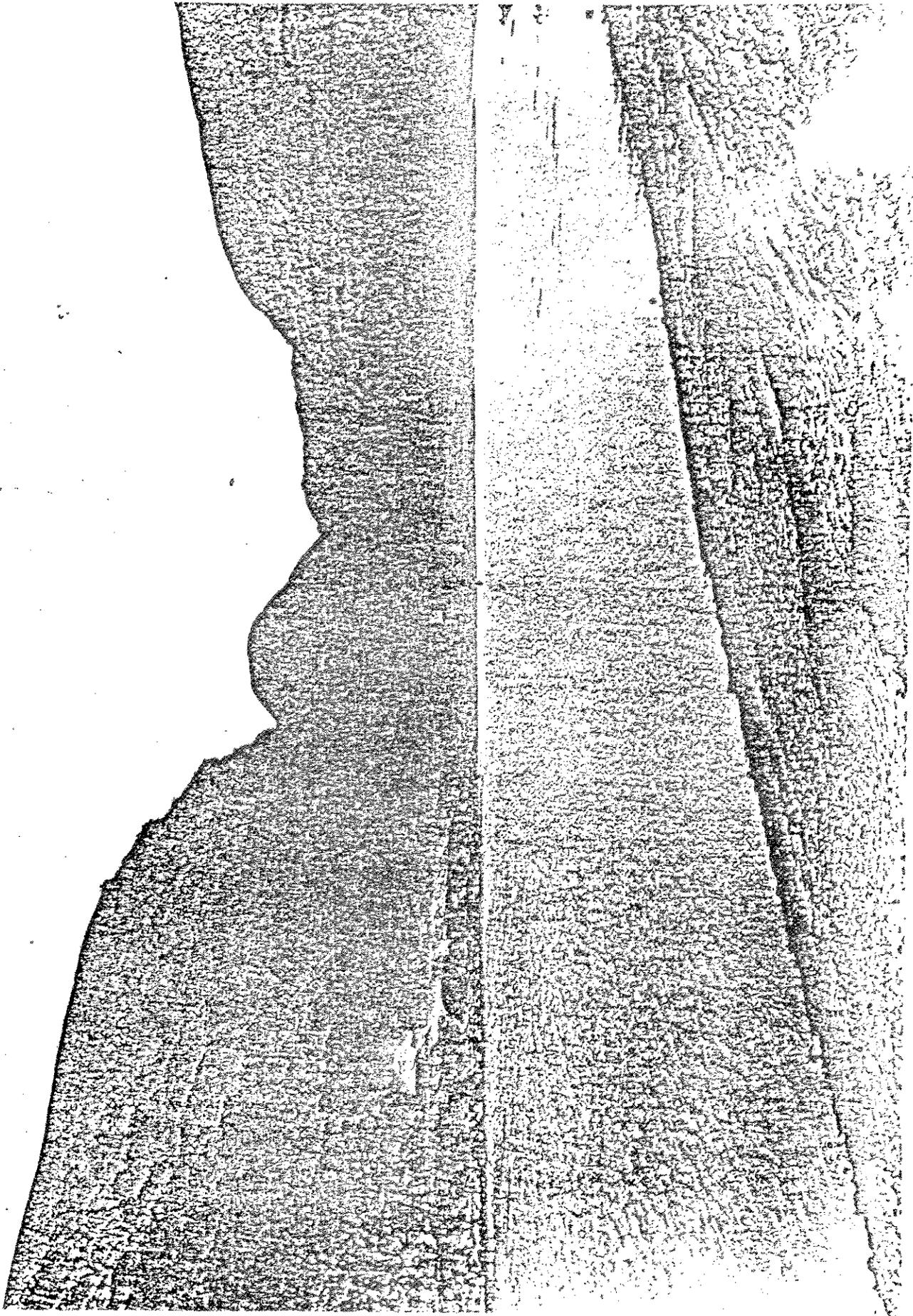


Fig. 2. WAIMEA VALLEY IN THE 1920s. Width of the river is great in the spring when the streams from the mountains begin to flow down to the sea.

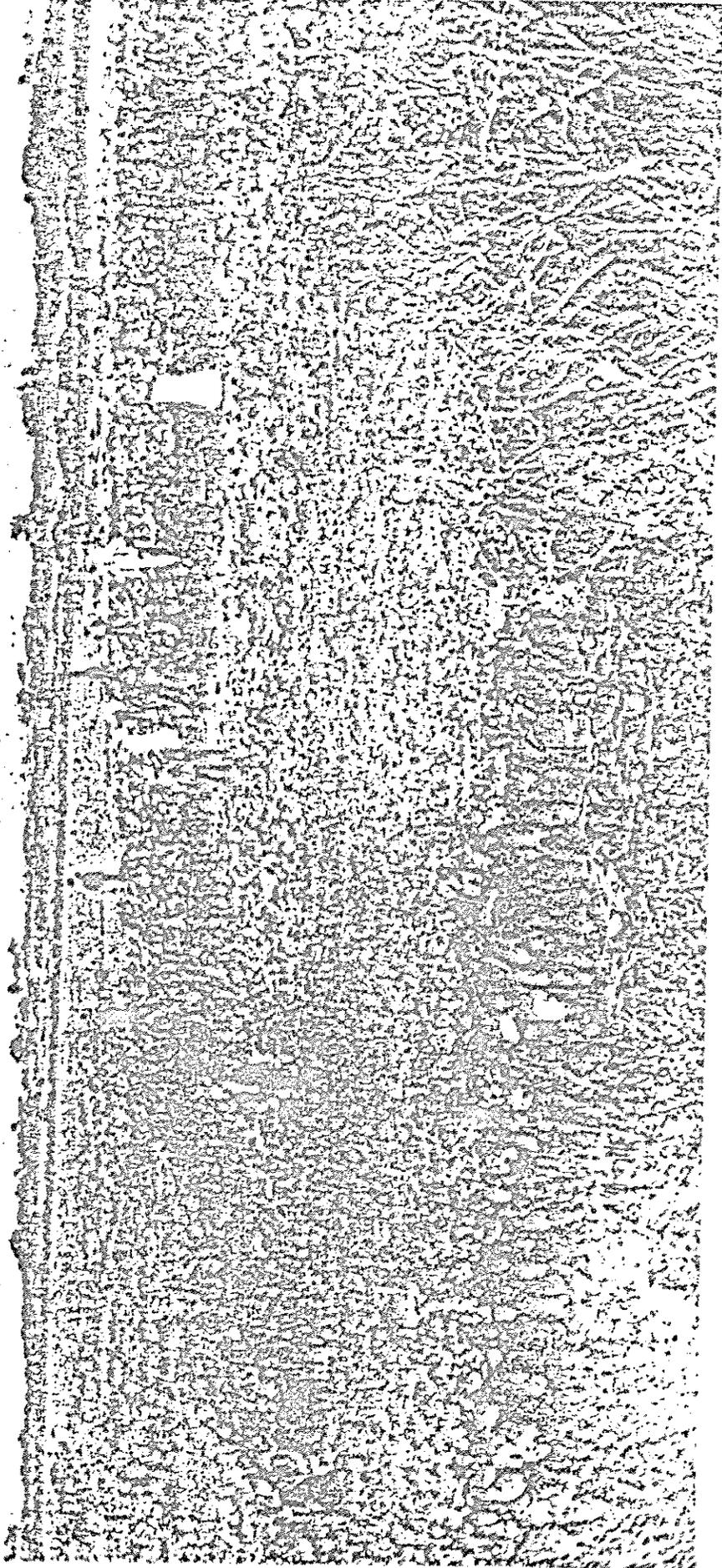


Fig. 3. THE KUPOPOLO HEIAU IN 1905. In the *heiau* are members of the Hawaiian Historical Society's Committee for the Preservation of Ku'opolo Heiau.
Photo from State Archives.



The Queen at Waimea, Oahu, recommending Christianity Page 207.

Fig. 5. WOODCUT OF HIRAM BINGHAM WITH KAAHUMANU IN WAIMEA VALLEY IN 1826. Hewahewa is somewhere in this picture. In Bishop Museum Library.



Fig. 6. JOHN SWIFT EMERSON, THE MISSIONARY OF WAIALUA STATION.
From Bishop Museum Library.

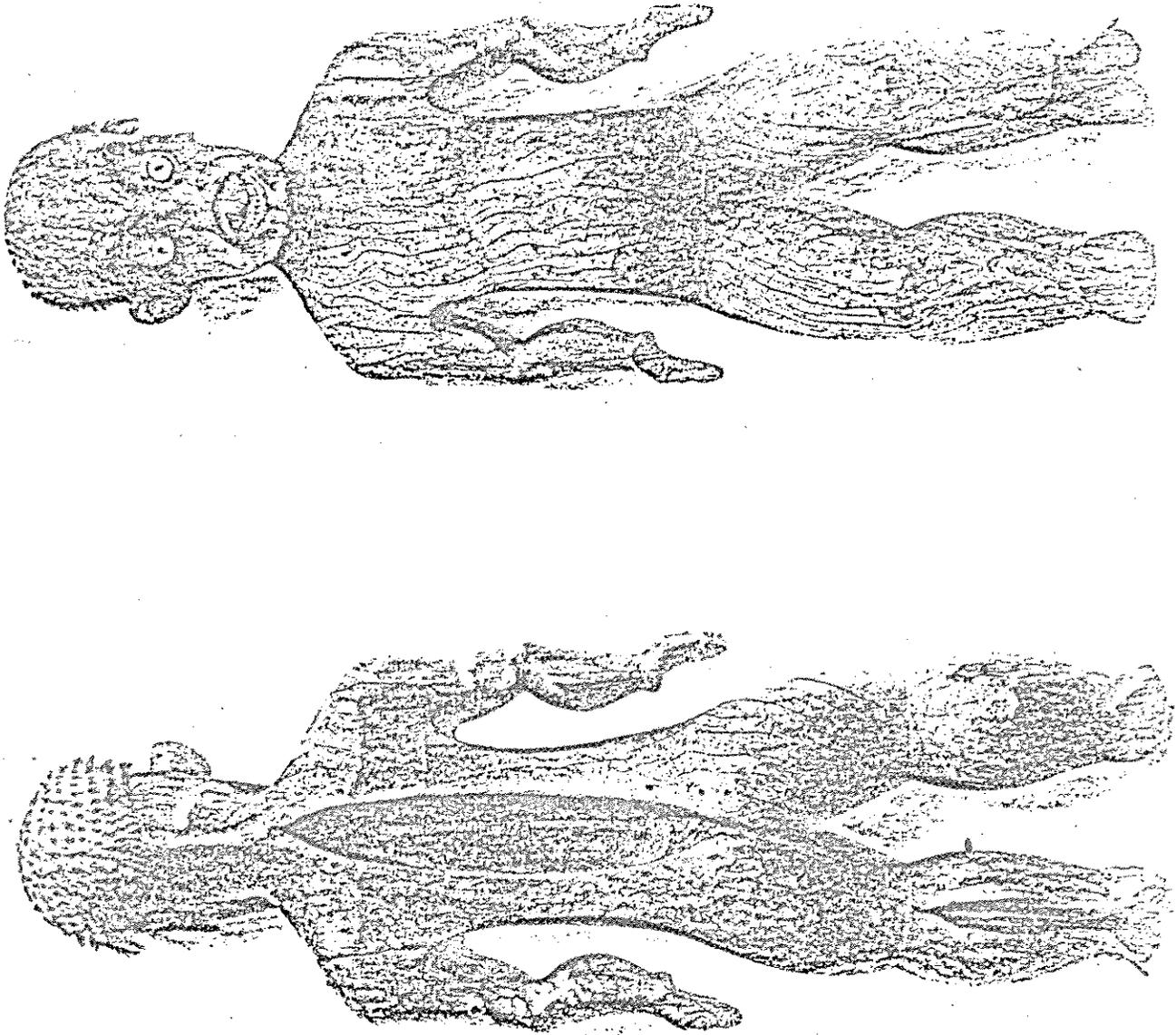


Fig. 7. WOODEN IMAGE FOUND IN WAINEA IN 1852 BY JOHN SWIFT EMERSON.
In Bishop Museum Collection.

INTRODUCTION

The history of Waimea Valley on Oahu will be presented as a case study of society in Hawaii from its mythical beginning to the twentieth century. This report will include the early myths and folklore of the valley and will trace its history through the mid-eighteenth century, when the importance of the valley was linked to the famous Kaopulupulu, the *kahunanui* (high priest and councillor) of Oahu. For the post-contact period, the interrelationships among the newly arrived foreigners, the high chief of an island, and his lesser chiefs, will be discussed using the *Daedalus* incident as the focal point for understanding the society of the times. The discussion of the sandalwood trade reflects the economic and social aspects of the early nineteenth century, and illustrates the economic reliance of the chiefs on the Yankee traders, both of whom ignored the burdens placed on the commoners. The coming of the missionaries marked the beginning of a new awareness of the common people, culminating in the land-commission awards when commoners spoke for themselves in claiming their *kuleana* lands. Thus, the social life of Hawaii in the mid-nineteenth century may be seen through the eyes of all the people--the ruling Hawaiians, the foreigners, and the common people. Finally, the growing political and economic power of the non-native population, the coming of laborers from the Orient, and the dwindling Hawaiian population mark additional changes in Hawaiian society. This story of Waimea ends when the people leave the land and it is taken over by Castle & Cooke. In conclusion, the history of Waimea Valley is a microcosm of the history of Oahu, reflecting the changes in the island's history through time.

To understand the attitudes and life style of the ancient Hawaiians it is necessary to discuss the impact of geography. Waimea Valley is isolated by mountains and the sea and could only be entered by fording Waimea River in the dry months, or by sea in wet months--there were no bridges across the river until the mid-nineteenth century. A legend mentions the high surf in the area, sandbars near the mouth of the river, and an almost overflowing estuary, noting potential flood conditions of the valley in the winter and spring (see Appendix C).

The importance of the sea to the valley is obvious in the legends and folklore of the area. Many stories center around Kaneaukai, a fish-god who came to the area, bringing with him huge catches of fish for the people of the area (see Appendix C). There are monuments dedicated to Kaneaukai--a fishing *ko'a* (shrine) near the shore and *makai* of the Kupopolo heiau and a rock shelter above Kupopolo [McAllister 1933: 146]. Although Kaneaukai is the main fishing god of the area, two other fish-gods, Ku and Ahuena, were worshipped; there are two stones, one on each bluff above Waimea Bay, named after them [McAllister 1933: 150].

The mountains, rising high on both sides of the valley, have hidden volcanic caves used by the Hawaiians as burial places. The inaccessibility of the caves, moreover, assured the religious-minded Hawaiians that their dead would remain safely hidden from the irreligious. According to McAllister [1933: 147, 150], these burial caves are on both

both sides of the valley; those on the N ridge have been looted or destroyed. Two informants (Edward Matsumoto; Francis K. Brown) reported that they know of caves containing canoes, tapa, *lauhala*, a surfboard, and other artifacts.

The fertile soil and the river, fed from a number of mountain streams, make the area a natural place for farming. Before the coming of the Europeans, the area was known for taro; sweet potatoes; 'awa, a root used to make a narcotic drink for religious ceremonies and rites; and breadfruit, harvested from trees found farther up the valley. McAllister reported agricultural terraces on both sides of the river for two miles, built of stone and standing about two feet in height; irrigation of some terraces indicated a relatively sophisticated agricultural area capable of supporting a heavy population in the valley [McAllister, 1933: 147]. It appears that the primary activity in the valley in prehistoric times was agriculture. The fishing *ko'a* on the shore, the burial caves on both sides of the valley, and the two *heiau*, Puu-o-Mahuka and Kupopolo, indicate the possibility of more extended prehistoric activities within the valley.

Of the two *heiau*, Puu-o-Mahuka has been recently recognized by the U.S. Department of the Interior as a National Historic Landmark. Puu-o-Mahuka, the largest *heiau* on Oahu, has been linked with the *kahumanui* of Oahu. The *heiau* has two massive divisions and one small side room. The two large divisions measure 281 ft long by 127 ft wide, and 186 ft by 168 ft. It was said that huge fires were lit, possibly dedicated to Ku to send messages to Kauai; according to Bingham [McAllister 1933: 148], the *heiau* was the birthplace of the *ali'i*. This was one of the earliest *heiau* to be preserved under the law passed in 1898 authorizing the Republic of Hawaii to preserve ancient *heiau* and *puuhonua* [Thrum, 1904: 7]. The inside of the *heiau* has some terraces, which indicates that there may have been some small farming plots for plants and foods [McAllister, 1933: 148].

The other *heiau*, Kupopolo, on the opposite side of the valley from Puu-o-Mahuka, is smaller in size, and measures 266 ft long by 110 ft wide. This *heiau* was used by *kahuna* who were seeking prophecies and making sacrifices; inside the temple walls, there is a pit 4 ft square, which may have been a receptacle used for remains of human sacrifices [Luter, 1938: 29-30]. Various historical and preservation societies, including the Hawaiian Historical Society in 1905, have been interested in Kupopolo. However, its status has been treated by the State Historic Review Board as merely of high value to the State. This mystery *heiau* may have had some importance which is lost to us today.

THE LEGENDARY HISTORY OF WAIMEA

In the myths of the *ali'i*, the Waimea area is connected with the Pao class of *kahuna* who supposedly held the valley and all the lands containing the word *wai* on Oahu since the time of Kamapua'a, the mythical pig demigod and paramour of the volcano goddess, Pele. It was said that Kamapua'a gave the lands to the *kahuna*, Lono-a-wohi, who held the monopoly

on all the well watered lands in the region. At some later date, the land was redistributed by Kahi-'ula and the older brothers of Kanaua'a, giving the lands in Waimea, Pupukea, Waiahole, and Hakipu'u to the *kahuna* of Oahu in perpetuity. In reality, however, the Paoa *kahuna* of Oahu only held the lands until the days of Chief Kahahana. The lands then went to the *kahumanui* who were selected by Kahekili and later by Kamehameha I [Kamakau, 1961: 230-31].

By the sixteenth century, although the high chiefs of Oahu nominally ruled the entire island, the chiefs of Ewa, Waialua, and Waianae held almost total power in their own areas, relegating the high chiefs' powers to their own patrimonial lands in the Koolaupoko region until the time of King Kualii of Oahu. Kualii asserted his sovereignty throughout the island, and through a series of battles in which he defeated the Ewa, Waialua, and Waianae chiefs, he unified the entire island under his rule [Fornander, II, 1969: 278-81]. Following unification, the high chiefs ruled the island with the help of the *kahumanui*. According to Malo, there were two types of *kahumanui* in the government; one attended to the religious ceremonies, and the other was the *kalaimoku*, or king's chief secular councillor [Malo, 1971: 188]. Thus, the high priest and the prime minister guided and modified the extent of the high chief's powers over the people.

In the middle of the eighteenth century, a *kalaimoku* named Kaopulupulu, whose ancestral lands were in Waimea and Waialua, received recognition as an astute prime minister and prophet [Fornander, II, 1969: 220]. Kaopulupulu's name first appears in the year 1773, when Kumahana, the direct descendant of Kakuhihewa and the high chiefs of Oahu, was overthrown through the efforts of the chiefs, priests, and commoners in a bloodless revolution. Kumahana was removed since he refused to take advice from others, was stingy, and spent all his time in pleasure [Fornander, II, 1969: 129].

Since the ancient Hawaiian system required the head of state to be of high *ali'i* blood lines, the people asked Kahahana, the nephew of the powerful King Kahekili of Maui and a noble whose blood ties connected him to the high chiefs of Oahu, to be their ruler. According to Fornander [II, 1969: 129], "...there was no opposition to the appointment since Kaopulupulu had sanctioned it, Kahahana was approved by all for his rule was established without war or bloodshed...", perhaps implying that the legitimacy of rule in 1773 rested with the decision of the *kahumanui*.

Why was the nephew of the high chief of Maui chosen to rule? If Kahahana ruled, the war-loving Maui ruler, Kahekili, would think twice before attempting a conquest of the island, thus saving Oahu from war and bloodshed. Secondly, the high rank of Kahahana was equal to that of the other high chiefs, assuring that the prestige of Oahu was equal to that of the other islands. Kahahana's rule would be a diplomatic coup for the people of Oahu only if he could establish independent rule of Oahu, guaranteeing its sovereignty against his uncle, Kahekili. It was necessary for Kahahana to free himself from the Maui court, but the will and independence for this line of action was lacking in the young chief. The wisdom of Kaopulupulu's choice, therefore, may be questioned.

Kahekili, who had his eyes on Oahu, granted his nephew permission to accept the rule and have his wife, Kekaupoiula, accompany him to Oahu with two provisos: that his nephew give him the whale-teeth ivory and also the area of Kualea, Oahu, known as one of the most sacred places because of the two war-drums and its sacred hill [Westervelt, 1926: 119-20]. Compromised, Kahahana promised to hand over all these things to Kahekili, not realizing that the objects requested by his uncle were symbols of Oahu's sovereignty and autonomy.

After Kahahana's rule over Oahu was firm, he informed the chiefs, governors, and councillors of his uncle's wishes. Kaopulupulu, who understood the meaning behind the request, refused to give the young king permission to grant Kahekili's request, justifying his refusal by pointing out that the sovereignty of the new ruler was dependent on the consent of the chiefs. "Had the country been yours by conquest, it might be proper for you to reward your uncle, but your authority was given to you by the chiefs because of your uncle Kumahana's mismanagement" [Kamakau, 1961: 129]. Thus, Kaopulupulu's interest in maintaining the power of the chiefs and the autonomy of Oahu conflicted with Kahahana's claim to Oahu's sovereignty by right of rule.

In the midst of this power struggle, Kahekili intervened, playing Kahahana off against Kaopulupulu. Aided by Kaopulupulu's brother Kaleopuupuu, the ambitious *kahananui* of Maui, Kahekili informed Kahahana that the rule of Oahu was offered to him by Kaopulupulu, but was refused [Fornander, II, 1969: 218; Kamakau, 1961: 133]. Kahahana's own gullibility made him ignore Kaopulupulu's advice and he began taxing the country people heavily, defiling their dead by using their bones to make arrow points for rat shooting and as fishhooks or trading them for skirts and *kahili* handles [Kamakau, 1961: 133]. His advice spurned, Kaopulupulu withdrew from the court and retired to his estates in Waialua and Waimea, allowing the intrigues of Kahekili to continue unchecked. He fell to tattooing his relatives' and household members' knees as a sign to all that Kahahana was deaf to his warnings [Fornander, II, 1969: 220].

Kaopulupulu added fuel to the rumor that he was thinking of replacing Kahahana with another ruler when Kahahana contemplated a tour of the island. Kaopulupulu told the already paranoid high chief that there were two routes, one right and one wrong [Fornander, II, 1969: 221]. Kahahana thought these words were a warning that his power might be taken away, so he decided to take the life of Kaopulupulu. During his tour around the islands, consecrating *heiau* and offering sacrifices, Kahahana sent for Kaopulupulu from his court at Waianae [Fornander, II, 1969: 221]. Although suspecting Kahahana of treachery, Kaopulupulu went to Waianae with his only son, Kahulupue. According to legends, at Kaena Point the *kahananui* prophesized that his death and the death of his only son would be avenged. In the spirit of martyrdom, Kaopulupulu and his son continued on to Waianae where Kahahana ordered that the two of them be put to death. Kaopulupulu was put to death; his son, Kahulupue, committed suicide. As his son dived to his death, Kaopulupulu is supposed to have said that the rulers of the island shall be people who "belong to the sea" [Malo, 1971: 115 and Fornander, II, 1969: 169f], meaning either that Maui would take over the island by sea, or that foreigners would conquer the islands.

Kaopulupulu, who made many prophecies, is credited with making another cryptic remark when Cook landed in Kauai. He is supposed to have said, "...they are foreigners from Hi'iukua, Uliuli, Melemele, Ke'oke'o--they are men who will possess the land" [Kamakau, 1961: 96]. But Kaopulupulu, who was apparently a better prophet and self-chosen martyr than diplomat and statesman,* was the last holdout against the taking over of Oahu by Kahakili. With his death, Kahakili invaded the islands in 1783 and defeated Kahahana.

During the time of Kaopulupulu, the importance of the valley was tied to the *kahunanui* who officiated at both of the *heiau*. There were no written records of the common people in the valley; in essence, the pre-history of Waimea is the story of the *kahunua* of the area.

EXPLORERS AT WAIMEA

"The sight of a fine river, running through a deep valley induced us to come to an anchor in thirteen fathoms water with a sandy bottom...

We were much disappointed to find the water had a brackish taste, for two hundred yards up the river owing to the marshy ground through which it empties itself into the sea. Beyond this, it was perfectly fresh and formed a fine running stream, along the side of which I walked till I came to the conflux of two small rivelets that branched to the right and left of a remarkably steep and romantic mountain. The banks of this river, and indeed the whole we saw of the northwest part of Oahu, are well cultivated and full of villages; and the face of the country is uncommonly beautiful and picturesque" [Cook's *Voyages*, London, 1784, Vol. III: 87; taken from Thrum, 1906: 114].

The beauty of Waimea Valley was recorded in the journal of Captain Cook by the first known Europeans who came to the islands. Enchanting though the valley looked, the crew on board the ships did not wish to stay more than the few hours needed to stock up on water, and went on for a brief stop-over in Kauai before returning to England with the remains of the ships' explorer-captain, James Cook.

The brief description of the marshy bay suggest that even in the 1700s, the sand may have bottled up the river periodically, forcing the river water to flow back into the valley; one cause, perhaps for the floods [Interview: Francis K. Brown]. This substantiates the legend that the valley did have problems with periodic floodings even before the mountains behind it were stripped of sandalwood (Appendix C). Another legend (Appendix C) indicates that there were quicksand areas at the juncture of Kamananui and Kamaaiki streams and Waimea River. In all, this suggests that the valley, although well populated and extensively farmed, was susceptible to natural disasters before the Europeans came to the island.

* This interpretation of Kaopulupulu differs greatly from that of Kamakau [1961: 89] who regarded him as a *kanaka hemolele*, a perfect man.

In 1779 Cook's ships left the Sandwich Islands, four years before King Kahekili defeated his nephew, Kahahana, and installed his son, Kalanikupule, as regent for Oahu. The rule of Kahekili was not without rebellions; plots against Kahekili by the Kona and Ewa clans were uncovered and brutally put down [Kamakau, 1962: 138]. One result of the rebellions was that the lands of the Oahu chiefs were given to Kahekili's Maui chiefs. In Waimea, although it is not known who ruled, it has already been established that the line of Kaopulupulu ended with his death and the suicide of his son. His brother, Kaleopuupuu, the *kahunanui* of Maui, may have received the Waimea land, although there is no record of this. In 1792, however, during the *Daedalus* incident, the chief of the area was Koi, the son of Kaleopuupuu. According to Kamakau [1962: 164], Koi was an influential *kahunanui* of the class of Kaleopuupuu, and the leader of the tattooed forces called *pahupu* (black division); he was involved in the attack on Vancouver's men.

The first event of political importance in the valley involved the store-ship of Captain Vancouver, the *Daedalus*. The *Daedalus* incident reflected the consciousness and consensus of the time, and was an expression of the relationships between the rulers and the common people, on the one hand, and between the chiefs and kings and the foreigners landing on the island, on the other hand.

The Hawaiians had already experienced the importance of gunfire as the decisive factor in the naval battle of "Kepuwahaulaula," between Kahekili and Kaeokulani. Added to this, there were incidents of humiliation inflicted on the Hawaiians by the Europeans. Capt. Simon Metcalfe, for example, had shelled a village on Maui and fired on defenseless Hawaiians at Olowalu in retaliation for the loss of a small boat and the death of the sailor guarding it, and also whipped a powerful chief on the Big Island for some petty offense [Kuykendall, 1968: 24-25]. During this uneasy truce, Captain Vancouver, one of the few captains who refused to trade arms and ammunition for food and supplies, set himself up as an arbitrator for the civil wars racking the Hawaiian Islands [Fornander, 1969, II: 246]. The arrival of the whites in Waimea Valley was a quiet affair, the earliest example being that of Captain Cook's crew, and according to Kamakau [1962:163] there were many other ships that did stop in the area. Jarves [1843:141], however, said that the Hawaiians were unaccustomed to the sight of ships.

On May 7, 1792, two months after Vancouver refused to barter firearms for food, the *Daedalus*, under the command of Lieutenant Hergest, landed off Waimea Bay, ostensibly to get water. The watering party, like Cook's, had to go farther upstream since there was brackish water near the bay. Two seamen, Lieutenant Hergest, and the astronomer, Gooch, were lured farther into the interior of the valley by Koi and his men offering to barter for food and supplies [Fornander, 1969, II: 248]. A quarrel erupted and one seaman was killed. The Hawaiians then attacked and stoned to death Hergest and the astronomer; the other seaman, Franklin, escaped and returned to the ship unharmed [Manby, J1, 1929: 35]. The ship then fired on the Hawaiians all night, until the ammunition was used up [Jarves, 1843: 142 and Dibble, 1909: 33]. Kamakau [1962: 164] claims that the firing continued for five days. According to Fornander [II, 1969: 249], the bodies of the three men were dissected and the bones were saved for future use at Mokuleia; according to Thrum and McAllister the bodies were probably sacrificed at Puu-o-Mahuka Heiau.

Did the Hawaiians attack the men on the orders from Kahekili or his regent, Kalanikupule? As far as can be ascertained, Kahekili wisely ordered all chiefs of the islands not to take guns by violent means and there was an order from the regent, Kalanikupule, forbidding the chiefs of the island to attack foreign vessels at Waikiki where he resided. However, it was implied that if peaceful bartering for munitions failed with "...any vessel that might touch at one of the way districts of the island," that the chiefs who took guns through other means would "...not only be punished, but would be looked upon and rewarded as a service rendered to the state or sovereign" [Fornander, II, 1969: 247]. It is also known that Koi went to Kalanikupule at Waikiki and presented him with munitions from the bodies of the men. Kamakau [1962: 164] states that Koi gave Kalanikupule muskets, guns, and swords; Manby [July, 1929: 254] notes that the arms taken were guns, pistols, and sidearms.

After being assured by Kahekili that the incident was simply an isolated one, Vancouver left with the request that all the Hawaiians implicated be punished [Kuykendall, 1938: 26]. When Vancouver returned to the islands, he heard that Kahekili had already put to death all the murderers except three or four. Vancouver, wishing to have punished all those involved, proceeded to Oahu for the trial, insisting the the chiefs themselves inflict the punishment [Fornander, 1969, II: 251]. Kahekili sent his younger brother, Kamohomoho, as high commissioner to assist Vancouver in this trial. Three men were brought to Vancouver's ship in Waikiki on March 20, 1793. The witnesses were men of the *Daedalus*, who identified the men as the murderers, although it seems possible from the writings of Fornander, Kamakau, and other sources that these men were innocent and the real culprits escaped. The men were sentenced to death and executed by a minor chief who shot them [Fornander, II, 1969:257-58].

The following year, Kahekili died and Kalanikupule had to fight Kaeokulani in a series of battles before being able to claim the title of high chief of Oahu. But in less than a year after Kalanikupule reigned in his own right, Kamehameha arrived on Oahu, defeated Kalanikupule's forces at Nuuanu, and unified all the islands except Kauai under one rule. Kamehameha further apportioned the lands of Maui and Oahu and gave them to the warrior chiefs of the Big Island. In this grant of land, Hewahewa, the *kahunanui* of Kamehameha, received the land in Waimea (a portion of Oahu so small that Ii [1959: 69-70] does not mention it at all).

THE KAMEHAMEHA RULE

Hewahewa was from Kohala and came along to Oahu with Kamehameha I. His duties were to accompany Kamehameha from island to island on his tours of conquest and interpret the ceremonies needed for a successful campaign [Emerson, 1928: 75]. His role was minimal compared to the powers of Kaopulupulu, the king-maker; his rule was more symbolic than real, as was that of his father, Puou. The only two recorded political actions of Hewahewa were that he consecrated or crowned the new king, Kamehameha II (Liholiho),* and urged Liholiho to eat with women. The power, therefore, of the *kahunanui* under Kamehameha I was comparatively weak compared to that of the *kahunanui* only a generation earlier.

*This even is suspect since there are no records of a real coronation or consecration except in the manuscripts of Kalakaua in the Archives, dated August 24, 1882.

The rule of Kamehameha has been discussed at length by many scholars, so it is not necessary to give more than a brief sketch of the king and certain of his policies. The year after the conquest of Oahu, Kamehameha decided to conquer Kauai; he ordered that all the hogs on Oahu be destroyed so that the newly conquered Oahuans would be forced to concentrate on survival during the famine, and would not rise up in rebellion [Kuykendall and Day, 1970: 28]. When he did make a circuit through the island the people between Waianae and Waiialua "did mischief with the potatoes" [Laanui, 1930: 87], suggesting that the country people were hostile to the rule of Kamehameha.

Kamehameha ruled on his own in almost every matter, and the influence of Hewahewa was minimal until Kamehameha's death. Under Kamehameha II, Hewahewa attempted to regain some of the powers of earlier *kahunas*. In 1819, he advised the young king to perform the symbolic act of *'ai noa* (free eating with women). Since nothing happened after breaking the *kapu* (taboo), Kamehameha II decreed that all images and *heiau* should be destroyed. Since Kamehameha I had held the gods of Hawaii, for the most part, under his own power, was the official guardian of the war god, and usurped much of the powers a *kahunas* held, Kamehameha II's act undermined the religious power of the monarch and with this, seemingly diminished the central authority of the crown. A year later, Hewahewa greeted the missionaries who landed as his "brother priests," siding with the new religious leaders as a political force against the authority of the chief, just as Kaahumanu, the prime minister, did. Hewahewa may have been conscious of the new power group in the islands. Emerson recorded evidence for this idea, although he seemed to miss the political implications: "Hewahewa expressed his affection for us, his confidence in us as leaders, and the wish to unite himself with the people of God and spend the remainder of his days in His service" [Emerson, 1928: 75-76].

THE SANDALWOOD TRADE

The authority of Kamehameha I extended into the economic realm. In 1790 sandalwood was discovered on the islands, but the quality was considered inferior to that of the Chinese sandalwood, so it took about twenty years before a booming trade developed. Until the death of Kamehameha I, the king had a complete economic monopoly on the sandalwood trade, allowing him the opportunity to place a *kapu* on the young trees so that the source of sandalwood could be conserved. When Kamehameha II became king, he was forced to share the trade of sandalwood with the chiefs; thus, the *ali'i* became economically independent of the king. With their newly acquired source of wealth, encouraged by traders, they began to buy all sorts of goods hitherto unattainable, such as silks, liquors, tableware, and foreign clothing. This trade continued unchecked until the islands were stripped bare of sandalwood by the chiefs, who were more interested in obtaining trade goods than in conserving the wood. In 1822 James Hunnewell, a founder of C. Brewer, wrote, "The picul weighs 133-1/3 pounds and a picul of sandalwood is commonly said to have been worth ten dollars; actually the value in China fluctuated between three and fifteen or eighteen dollars. The Hawaiian wood was not of the highest quality" [Kuykendall, 1938: 91].

Although sandalwood had been taken from the Waimea mountains earlier under the orders of Kamehameha I--Corney wrote that in April, 1818, his ship sailed into Waimea Bay for another cargo of sandalwood, taking thirty-six hours to load [1965:185]--the rate of removing sandalwood from Waimea Valley increased only when Hewahewa was able to share in the profits.

Two documents of this period, one by Reynolds and the other by Hunnewell, record the role Waimea Valley played in the period of sandalwood trading, describe the conditions of the times, and give us a picture of the mental outlook of the Yankees and the chiefs. Hunnewell, a dealer of sandalwood for a Boston firm, failed to understand the drudgery of the work for the commoners, for he constantly tried to pressure the chiefs into forcing the commoners to bring the wood to one central station in Honolulu [Hunnewell's letter to Capt. A. Blanchard, dated Nov. 20, 1821]. In the hope of obtaining more sandalwood, Hunnewell built special houses on the shore, including one at Waimea, one of the centers for sandalwood, and complained to the king when the chiefs refused to send their men farther and farther into the interior once the wood near the shore was depleted [letter to Henry A. Peirce, April 14, 1831, Hunnewell Ms.]. Reynolds also recorded two interesting meteorological conditions near or in the area of Waimea. In an entry on January 1, 1828, he noted a strong northeast wind which destroyed a very large fishpond in Koolau. On September 3, 1828, he recorded high surf breaking on the shore of Waimea, ruining the wood stored near the mouth of the river.

By August 9, 1828, according to Reynold's journal, very little sandalwood was left on the island and the trade had been replaced by whaling. The two journals end at this time, but in the pages it is interesting to note that they do not speak of the burdens the commoners underwent for the precious sandalwood. One of the few conscious authors of the period was Samuel Kamakau who recorded the drudgery of the labor and the lack of sympathy or dignity extended to the commoners in the mountains by the chiefs and the traders. In Kamakau's description below, the area in question is near Waimea:

"After Kahala-i'a's death all repaired to the uplands of Waialua adjoining Waimea, to upper Kolokini, Wao'ala, 'Aikanaka, Kaloka in upper Makeleha, and to upper Mokule'ia, to cut sandalwood...While they were in upper Waolani the men contracted a skin disease like the white pit found on the bark of the sandalwood tree... Such a huge amount of sandalwood was cut that they could not load it all onto their own ships and had to put part on a Portuguese three-masted to carry to Honolulu" [1961: 278-279].

THE MISSION STATION AT WAIMEA

Although the missionaries landed in 1820, their initial connection and exposure to Waimea Valley was slight. There were no regular churches

established in the area until the 1830s--more than a decade after the first wave of missionaries landed and a year after the sandalwood traders left the area. Earlier, the missionaries were centered in Honolulu and in the larger cities on the other islands, emphasizing teaching to the *ali'i* and the children of the chiefs. Waimea as a way-station was not of great importance and was neglected until there were enough missionaries available to preach in the country.

Until the Waialua station was opened, the only indication that the missionaries went there was one small journal entry in 1826 by Hiram Bingham, who wrote that he visited the area with Kaahumanu and was greeted by Hewahewa. The missionaries were just as astonished by the beauty of the valley as Cook's men were earlier:

"The valley of Waimea, through which a stream from the mountainous interior winds its way to the ocean, is almost environed by mountains rising beautifully on three sides of it, one behind another, from the sea-side to the interior. At the opening of this valley where, in the days of Hawaiian barbarism... the inhabitants of the place assemble with the representatives of almost every district of this island...to hear the sabbath sermon" [1848: 295].

It was not until 1832 that the missionaries decided to set up a station at Waialua to supply the spiritual and educational needs of the Koolau and Waialua Districts under the direction of John Swift Emerson and his wife, Ursula. The first objective, building a meeting house, was accomplished on September 25, 1833, and for the occasion, Dr. Judd, Mr. Bingham, and Mr. Brinsmade, a merchant from Honolulu, came. Laanui, the chief of Waialua District and an *ali'i* of the Big Island, had issued orders that everyone in the district of Waialua come under the threat of severe penalty, and "...one woman came nearly four miles from Waimea and returned, hopping all the way on one foot, as she had lost the other" [Emerson, 1928: 88]. The obvious alliance between the chiefs of the area and the missionaries pressured the people into attending church and accepting Christianity. Rather than being grateful for the powerful friends they had, however, from the letters of the Emersons, it would seem as though the bulk of the missionaries' time was spent either in ordering supplies and wishing for the staple foods of New England, or watching and condemning the acts of the chiefs. ("Hewahewa is at Honolulu, and I learn that he is drunk again...I know not what will be the end of this wickedness" [letter from Emerson to Chamberlain, Oct. 10, 1834]). The second objective of the missionaries was to educate the commoners in the art of reading, writing, and arithmetic. Several classes were held for children and adults.

The missionaries, by necessity, acted as doctors in the country [Emerson, 1928:63] and published a weekly newsletter, *Ai-o-ka-la* (Daily Food) with verses from the scriptures [Emerson, 1928: 100]. Since the area of the parish was so vast, Emerson was forced to travel miles into separate valleys in the Koolau District every Sunday, coming into direct contact with the people. To facilitate his work, Emerson kept church records of Waimea along with the rest of Waialua and Koolau, noting baptisms, excommunications, marriages, and migrations in a shorthand which is difficult to translate since the symbols used do not

have a key (see Appendix A). These records, invaluable for their listing of the specific names of individuals of the valley, can be a great aid in understanding the life of the area. After Hewahewa's death in 1837 (published in the March 4, 1837, *Sandwich Island Gazette*), and perhaps subsequent burial in Waimea Valley (Interview: Abigail Kaleiheana, who also said that the burial place, marked by a stone slab, was *kapu* to everyone), the land passed to his son, Kamokumaia (Probate 2480). In Emerson's records, the *konohiki* did not live in the area, although his wife, Kualii, did (this can be substantiated by the church records which note that she was excommunicated and then restored). Moreover, from the government documents, it is evident that Paalua, the daughter of Kamokumaia, and Kualii lived in Honolulu and controlled all the affairs of the valley from Honolulu (Paalua's name does not exist in the Waialua church records). As for the general area of Waimea, the number of births rarely, if ever, was greater than the recorded number of deaths, indicating that the population of the area was decreasing, at least at the rate of five people per year. Since these figures are very conservative and do not record the number of infanticides nor non-church members, it may be fair to assume that the rate of depopulation was much higher and suggests that the area was affected in its economic, social, and cultural development by a rapidly declining population.

The people, for the most part, were God-fearing individuals whose major sins were adultery, drunkenness, and lying. There is no record of any foreigners living inside of the valley, although the cattle that they possessed frequently strayed in the valley and wrecked havoc on the area, devastating the fields that the residents farmed. The conditions of the valley were made worse by epidemics and the ever-present venereal diseases [Wyllie, 1847: 49]. In 1849 Emerson reported to the board that in October, 1848, there were massive simultaneous outbursts of influenza, measles, and whooping cough, in which 298 people from Koolau and Waimea died [Waialua Station Reports, 1849].

The people, demoralized and dying, were still under the power of their chiefs, who taxed them heavily. Moreover, nature seemed to work against them. There were floods in the area, lack of transportation, and no bridge to cross Waimea River, and, finally, a drought lasting two years almost totally wiped out the *kalo* crop [Waialua Station Reports, 1863].

For the missionaries, there were other problems. Once the Catholics were allowed to land on Oahu, they made rapid converts of the people, especially the commoners. By 1839 the Catholics became, for the Emersons, strong competitors for the beliefs of the commoners. On the North Shore, the Catholics gained more and more converts through Hawaiian emissaries [letter of Emerson to Chamberlain, Oct. 1, 1839]. The Protestants, on the other hand, indirectly contributed to Catholic conversions by excommunicating some Hawaiians from the Congregational church [letter from Emerson to Lyons, Jan. 11, 1841]. Moreover, some of the schools, used as instruments to spread the Protestant faith, were taken over by the Catholics. The government, desiring to accelerate literacy throughout the islands, agreed to subsidize any school, Catholic or Protestant, which had over fifteen students enrolled. The race to build schools and employ teachers began and in the competition Hawaiian

teachers were recruited and hired by both sides, ending the educational hegemony the missionaries held [letter from Emerson to Chamberlain and Hale, July 29, 1841]. The year 1851, however, saw the end of the Catholic conversion among the people in the area, and by 1861, in the last Waialua Station Report, the Mormons had moved into the area.

THE GREAT MAHELE

Earlier, the government had instituted a series of acts known as the Great Mahele, allowing chiefs and commoners to claim parcels of land. Under the Mahele, Paalua was awarded half of the *ahupua'a* of Waimea Valley under Award 13 in return for giving up her claim to the entire valley [Int. Dept. Land, Letter from M. Kaeliwai to Keoniana, Feb. 10, 1852]. Besides the land and fishponds in Waimea, Paalua received Award 13B for land in Ka'u, Hawaii, both under the name of her husband, Kaeliwai, another *konohiki* (landlord) who owned pieces of land on Molokai and in Kailua, Oahu, in his own right. The people received the right to claim title to small farms, *kuleana*, in the other half of Waimea Valley not owned by Paalua. From their testimonies, all the farmers raised *kalo* and had lived on the lands after Kamehameha united the islands.

In 1884, Paalua sold the land to her foster son, Albert K. Kumiekea, the natural son of Kamehameha III, but the young man gave back the land soon afterwards; the transfer was a way for the *konohiki* to avoid foreclosure on the heavily mortgaged land. Paalua was frequently forced to mortgage her lands and, in one particular period, even forced to mortgage her famous orange trees to obtain money. Sometime during the mortgaging, Paalua entered into an agreement with other members of the *kuleana* awards, creating a *hui* called Waimea Lands Hui, with the greatest share claimed by the *konohiki*.

When Paalua died in 1886, she willed the land and all her possessions to her third husband, Mikaele Kawainui [Probate 2480]. Since her husband was unable to keep up the mortgage payments, the land was foreclosed and picked up by Julia Anthon Paty through her lawyer, Mr. Carter. When Julia Paty died, the land was willed to two of her daughters, Mary Frances Van Valkenburg and Annie Elizabeth Mott-Smith. The two sisters, together with Oahu Land and Railway Company, Ltd., and Hawaiian Land Improvement Company, Ltd., filed in land court for a perpetual right-of-way to Kawai-*loa* and for the unclaimed *kuleana*; they won the right-of-way for the railroad and the unclaimed *kuleana* for the two sisters [Land Court 561]. Finally, the land was given up by the two sisters and sold at a public auction in the 1930s. Waialua Agriculture Company, who had earlier acquired *kuleana* in the area, now owned all the land in the valley, except for one or two small *kuleana* still held by Hawaiians.

Most Hawaiians did not stay on the land after the turn of the century, following a series of floods in 1894 and 1898 which wiped out the bridges in Waimea and inundated the entire lower valley. In some cases, the residents leased their land to various pineapple and sugarcane companies who hired Oriental farmers to raise pineapple and sugarcane in the valley, or else sold their *kuleana* to various land companies.

The laborers who worked for the various companies, lived in the back of the valley (near the area that informant Francis K. Brown calls a former leper colony) in small houses near the Shinto shrine which is still there today. Some Hawaiians remained in the area, but were living at the mouth of the valley, near the bay, subsisting by fishing, farming, and selling Hawaiian curios [interview: Francis Kipapa Brown].

Perhaps an indication of the changes in the valley can best be seen through an understanding of the different boundary changes of the area. In 1886 the *ahupua'a* of Waimea was taken from Koolauloa and added to Waialua (see Appendix C) as the population of the area decreased. By the turn of the century, when the valley was being farmed by Oriental laborers, the post-office box of the area was in Manawai and today, the valley is part of Haleiwa [interview with Francis Kipapa Brown]. Waimea Valley continually changed its boundaries or postal districts as the population diminished or shifted from one area to another.

Castle & Cooke's land subsidiary, Helemano Land Company, leased Waimea land to various individuals, including one by the name of Talbert Long, who spent hundreds of dollars trying to find a buried treasure [interview with Don Camp]. In the 1960s Castle & Cooke exchanged the land with the Bishop Corporation, who still holds it today.

BIBLIOGRAPHY

- Bingham, Hiram
 1848 *A Residence of Twenty-One Years in the Sandwich Islands: Or the Civil, Religious, and Political History of those Islands.* Hartford: Hezekiah Huntington, and New York: Sherman Converse.
- Briggs, Lloyd Vernon
 1926 *Experiences of a Medical Student in Honolulu and on the Island of Oahu. 1881.* Boston: David D. Nickerson Company.
- Chinen, Jon J.
 1958 *The Great Mahele: Hawaii's Land Division of 1848.* Honolulu: University of Hawaii Press.
- Corney, Peter
 1965 *Early Voyages in the North Pacific, 1813-1818.* Fairfield, Washington: Ye Galleon Press, 1965.
- Dibble, Sheldon
 1909 *A History of the Sandwich Islands.* Honolulu: Thomas G. Thrum.
- Emerson, John Swift
 ms. *Letters.* In Mission Children's Society Library.
 ms. *Personal Accounts.* In Mission Children's Society Library.
- Emerson, Joseph Swift
 1917 "Selections from a Kahuna's Book of Prayers", *Twenty-Sixth Annual Report of the Hawaiian Historical Society for the Year 1917.* Honolulu: Paradise of the Pacific Press, 1918. pp. 17-39.
- Emerson, Oliver Pomeroy
 1928 *Pioneer Days in Hawaii.* Garden City, New York: Doubleday, Doran & Company.
- "Floods on the Other Side: Not a Bridge is Standing Between Kahana and Kahuku"
 March 29, 1898. Evening Bulletin.
- Foreign Office and Ex.
 Kalakaua. Coronation Documents. August 24, 1882. In Hawaii State Archives.
- Fornander, Abraham
 1969 *An Account of the Polynesian Race: Its Origin and Migration and the Ancient History of the Hawaiian People to the Times of Kamehameha I.* Vol. II. Rutland, Vermont and Tokyo, Japan: Charles E. Tuttle Company.

"Hail in Honolulu"

February 26, 1894. *The Daily Bulletin*.

"Hawahewa"

March 4, 1837. *Sandwich Island Gazette*.

Hungerford, John B.

1962 *Hawaiian Railroads*. Reseda, California: Hungerford Press.

Hunnewell, James

ms. *Papers of James Hunnewell, 1820-1824: Ventures in Ships Thaddeus, Rover, Pearl*. In Bishop Museum Library.

ms. *Papers of James Hunnewell, 1826-1834: The Beginning of C. Brewer and Company, Ltd.* In Bishop Museum Library.

Ii, John Papa

1959 *Fragments of Hawaiian History*. Honolulu: Bishop Museum Press.

Interior Dept. Kingdom of Hawaii

ms. Land File. Honolulu, April 20, 1849: Letter from Kaeliwai to Keoni Ana, Minister of the Interior. In Hawaii State Archives.

ms. Land File. Honolulu, October 25, 1849: Letter from John O Davies to Keoni Ana, Minister of the Interior. In Hawaii State Archives.

ms. Land File. Honolulu Hale, Jan. 30, 1850: Letter from S.P. Kalama to Kaeliwai. In Hawaii State Archives.

ms. Land File. Honolulu, August 26, 1850: Letter from G. W. Marsh to Prince Lot Kamehameha, Minister of Interior. In Hawaii State Archives.

ms. Land File. Honolulu, February 10, 1852: Letter from M. Kaeliwai to Keoni Ana, Premier. In Hawaii State Archives.

Jarves, James Jackson

1843 *History of the Hawaiian or Sandwich Islands, Embracing Their Antiquities, Mythology, Legends, Discovery by Europeans in the Sixteenth Century, Re-Discovery by Cook with their Civil, Religious, and Political History, from the Earliest Traditionary Period to the Present Time*. London: Edward Moxon.

Kamakau, Samuel M.

1961 *Ruling Chiefs of Hawaii*. Honolulu: Kamehameha School Press.

Kingdom of Hawaii. First Circuit Court.

Probate 2480.

- Kuykendall, Ralph S.
1938 *The Hawaiian Kingdom, 1778-1854: Foundation and Transformation.* Honolulu: University of Hawaii Press.
- Kuykendall, Ralph S. and A. Grove Day
1970 *Hawaii: A History from Polynesian Kingdom to American State.* Englewood Cliffs, New Jersey: Prentice-Hall, Inc.
- Laanui, Gideon
1930 "Reminiscences of Gideon Laanui". *Thrum's Hawaiian Annual*, pp. 86-93.
- Luter, George W.
1938 "Discovering Hawaii--The Heiau of Kupopolo." *Paradise of the Pacific*, Feb. 1938, pp. 29-30.
- Malo, David
1971 *Hawaiian Antiquities (Mooolelo Hawaii).* Bernice P. Bishop Museum Special Publications 2, Second Edition. Honolulu: Bishop Museum Press, 1971.
- Manby, Thomas
1929 "Journal of Vancouver's Voyage to the Pacific Ocean (1791-1793)." *Honolulu Mercury*. Vol. I, No. 2 (July 1929), pp. 33-45.

1929 "Journal of Vancouver's Voyage to the Pacific Ocean (1791-1793)." *Honolulu Mercury*. Vol. I, No. 3 (August, 1929), pp. 39-55.
- Menzies, Archibald
1920 *Hawaii Nei 128 Years Ago.* Honolulu: n.p.
- "Restoration on Waimea Bridge"
April 2, 1898. *Evening Bulletin.*
- Reynolds, Stephen
ms *Journal of Stephen Reynolds, July 1, 1838 to April 30, 1842.*
In Bishop Museum Library.
- Summers, Catherine C. and Elspeth F. Sterling
1962 *Sites of Oahu.* Honolulu: Bishop Museum Press.
- Territory of Hawaii
Land Court Case 561.
- Thrum, Thomas
1907 "Heiaus and Heiau Sites Throughout the Hawaiian Islands." *Thrum's Annual*, 1907, pp. 36-48.

1907 "Tales from Temples." *Thrum's Annual*, 1907, pp. 49-69.

ms. "List of Heiaus (Temples)." In Hawaii State Archives.

Thrum, Thomas

1904 "A Visit to Waimea, Oahu." *The Friend*, Vol. 61, No. 8
(August, 1904), p. 7.

Waialua Station Reports

ms. In Hawaiian Mission Children's Society Library

Westervelt, W. D.

1926 *Hawaiian Historical Legends*. New York: Fleming H. Revell
Company.

Wright, John

1961 *A Brief History of Benjamin Franklin Dillingham and the
Beginning of the Oahu Railway and Land Company*. Honolulu:
Oahu Railway and Land Company.

Wyllie, Robert Cricton

1847 *Answers to Questions: Proposed by His Excellency R.C. Wyllie,
His Majesty's Minister of Foreign Relations, and Addressed to
all the Missionaries in the Hawaiian Islands*.

INTERVIEWS:

Francis Kipapa Brown, May 22, 1974

Donald Camp, April 30, 1974

Abigail Kaleiheana, June 4, 1974

Edward Matsumoto, May 10, 1974

Earl Nishimura, May 3, 1974

Geoge Souza, May 3, 1974.